mathsquad

BOOK 1

Key Skills Training - L3+

name: _____

Welcome to the Key Skills Training Program for Schools. These sheets are designed to give you multiple opportunities to learn and revise key mathematical skills. Completing these sheets will help you become equipped with the skills you need to be a successful user of mathematics in school and also every day life. The following points will help you get the most out of the program. Enjoy!

- When you see the ✎ symbol include some working to support your answer. This could involve a calculation, annotating a diagram or an explanation of your thought process.

- All fractional answers must be given in simplified form.

- You may be able to complete very few questions or almost all of them, it doesn't matter. As long as you give your best effort and try to improve each time you are maximising your success!

- If you feel that some or all of these questions aren't suitable for you, have a chat with your teacher.

Time to get started on Sheet 1. Turn the page and complete the questions on pages 2, 3 and 4.

Key Skills Training Level 3+	Name:
Sheet 1	Due date:

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-3 - 4 =$ b. $^-3 + 5 =$ c. $^-4 - {}^-1 =$ d. $1 + {}^-6 =$	2. a. $^-4 \times {}^-6 =$ b. $^-4 \times 7 =$ c. $10 \div {}^-2 =$ d. $^-12 \div 2 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $9^4 \times 9 =$ b. $2^7 \div 2^2 =$ c. $(6^8)^2 =$	4. a. Simplify 11:110 b. Divide 156 into the ratio 9:4
5. ✎ a. Calculate $5\left(-\frac{1}{2}\right)$ b. Calculate $-4 + \frac{5}{2}$	6. a. ✎ Convert $\frac{10}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{10}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 2.98×2.5	8. ✎ Increase 33 by 6%.
9. Simplify the following. a. $6 - 1 - 5x$ b. $6x \times 6$	10. Simplify, give answers with positive powers. a. $\frac{a^7}{a^5} =$ b. $\frac{2a^5}{5a^3} =$	11. a. Expand $4(5x + 5)$ b. Expand $-3(5x + 1)$	12. a. Factorise $6x + 8$ b. Factorise $-22 + 11x$
13. ✎ Substitute $x = 6$ into $5x - 16$ and evaluate.	14. ✎ Substitute $x = 3$ into $5(x - 1)$ and evaluate.	15. ✎ Substitute $x = -4$ into $2x - 1$ and evaluate.	16. ✎ Substitute $x = \frac{3}{7}$ into $-4x - 2$ and evaluate.
17. ✎ Solve the following: $5 + 9x = 59$	18. ✎ Solve the following: $14 = 7(x - 1)$	19. ✎ Solve the following: $6x - 8 = 5x - 4$	20. ✎ Solve the following: $11 = 3(x - 4)$

| 21. Consider the linear relationship $$y = 2x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = 2x + 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Table for Question 23:
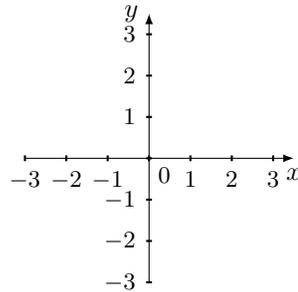
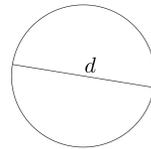| x	-1	0	1	2	3
y	-6				22

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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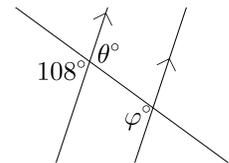24. ✎ To the nearest whole number calculate the area of the parallelogram.

19.6*mm*

7.8*mm*

9.8*mm*

$A \approx$
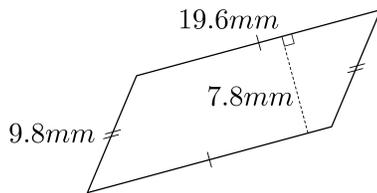
25. ✎ The circle below has a diameter of 17.2cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius $=$

b. circumference $=$
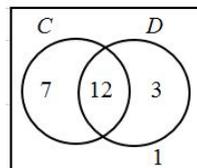
c. area $=$

26. Consider the diagram below.

$\theta°$

$108°$

$\varphi°$

a. State the size of the unknown angles.
   $\theta° = $ $\varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	4	4	8
D'	13	6	19
Total	17	10	27

a. P(D)=

b. P(C and D)=

28. Calculate the following probabilities using the Venn diagram below.

C D

7   12   3

1

a. P(C)=

b. P(not D)=

29. ✎ Calculate the following statistics for the below data set

$$3, 4, 2, 6, 6$$

a. median $=$
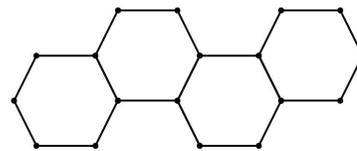
b. mean to 1 dp. $=$

c. mode $=$

d. range $=$

30. On Monday it was -7°C and on Tuesday it was -2°C. Which day was colder and by how much?	31. ⊕ The highest common factor of 6 and 15 is: **A.** 3 **B.** 21 **C.** 30 **D.** 90	32. Rods are used to make this pattern of hexagons. If this pattern continues, how many rods will be used to make a pattern of 15 hexagons? **A.** 90 **B.** 75 **C.** 89 **D.** 76
33. Calculate $(-4)^1$	34. Simplify $1\frac{3}{4} : \frac{5}{8}$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td></td><td>-4</td><td></td><td>-7</td><td></td></tr></table> $$y =$$
36. ✎ A number is increased by 20% and the result is 87.6. What was the original number?	37. ✎ The 1st term of an arithmetic sequence is 27 and the 2nd term is 30. What is the term number of 258?	38. ✎ How many numbers less than 1000 have digits which sum to 8?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $3 - 5 =$ b. $^-1 + 3 =$ c. $6 - ^-1 =$ d. $^-3 + ^-4 =$	2. a. $^-6 \times 6 =$ b. $3 \times ^-8 =$ c. $24 \div ^-4 =$ d. $^-40 \div ^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(4^4)^5 =$ b. $\frac{5^8}{5^5} =$ c. $8^7 \times 8^5 =$	4. a. Simplify 35:45 b. Divide 44 into the ratio 3:8
5. ✎ a. Calculate $-9\left(\frac{2}{3}\right)$ b. Calculate $-2 + \frac{7}{6}$	6. a. ✎ Convert $\frac{1}{9}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{1}{9}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.13×0.197	8. ✎ Increase 36 by 70%.
9. Simplify the following. a. $-6z - 4 - 7z$ b. $-3 \times 4z$	10. Simplify, give answers with positive powers. a. $(x^2)^2 =$ b. $2y^4 \times 5y^3 =$	11. a. Expand $3(6x - 2)$ b. Expand $-12(x - 2)$	12. a. Factorise $20x + 16$ b. Factorise $-24 - 30x$
13. ✎ Substitute $x = 2$ into $6x + 2$ and evaluate.	14. ✎ Substitute $x = 84$ into $\frac{x}{7} - 7$ and evaluate.	15. ✎ Substitute $x = 6$ into $1 - 9x$ and evaluate.	16. ✎ Substitute $x = \frac{1}{10}$ into $-5x + 3$ and evaluate.
17. ✎ Solve the following: $6x - 21 = 3$	18. ✎ Solve the following: $2 = \dfrac{x + 6}{4}$	19. ✎ Solve the following: $4x - 1 = 3x + 1$	20. ✎ Solve the following: $3x - 5 = 7x - 20$

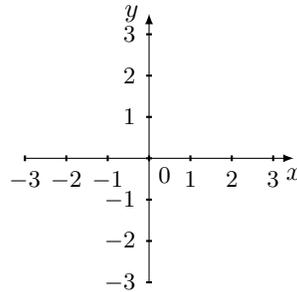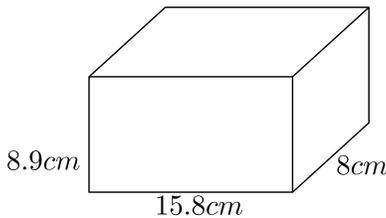| 21. Consider the linear relationship $$y = -4x + 1$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$	22. Sketch the graph of $y = -4x + 1$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

For Q23:

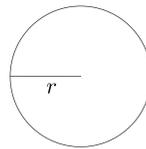| x	-1	0	1	2	3
y		-4		-14	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

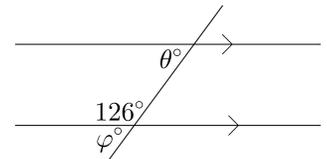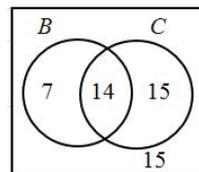| 24. ✎ To the nearest whole number calculate the volume of the rectangular prism. 8.9cm 8cm 15.8cm $$V \approx$$	25. ✎ The circle below has a radius of 18.4cm. Calculate the following, giving answers to 2dp. where appropriate. a. diameter = b. circumference = c. area =	26. Consider the diagram below. $\theta°$ $126°$ $\varphi°$ a. State the size of the unknown angles. $$\theta° = \qquad \varphi° =$$ b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.	28. Calculate the following probabilities using the Venn diagram below.	29. ✎ Calculate the following statistics for the below data set

For Q27:

	B	B'	Total
C	13	11	24
C'	2	1	3
Total	15	12	27

a. P(C)=

b. P(B and C)=

For Q28:

a. P(B)=

b. P(B or C or both)=

For Q29:

$$7, 2, 6, 8, 9, 6, 1, 6$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort ★ You may use a calculator on questions 30-32 unless otherwise stated		

30. ✎ Rupashri bought 24 pens for $8.40. How much did each pen cost?	31. ⊕ Which expression below is the factorised form of $-12x + 8$? **A.** $-2(6x + 4)$ **B.** $-2(6x - 4)$ **C.** $-4(3x + 2)$ **D.** $-4(3x - 2)$	32. ✎ What is the value of $3 + 5x - x^2$ when $x = -1$? **A.** -3 **B.** -1 **C.** 7 **D.** 9
33. Calculate $(-3)^3$	34. Simplify $1.2 : 1$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td></td><td></td><td>-7</td><td></td><td>-10</td></tr></table> $y =$
36. ✎ Determine the exact value of the radius of a circle which has an circumference of 56.7cm.	37. ✎ The 12th term of an arithmetic sequence is -5 and the 22nd term is -35. What are the first three terms of this sequence?	38. ✎ A class of students had some money to share among themselves. When they took $8 each the last student only got $3. When they took $7 each there was $16 left over. What amount of money were the students trying to share?

| mathsquad | Key Skills Training Level 3+ | Name: |
| | Sheet 3 | Due date: |

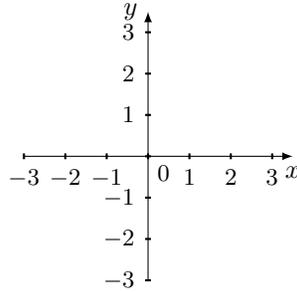| 1. a. $5 - 6 =$

 b. $^-3 + 1 =$

 c. $^-3 + ^-3 =$

 d. $3 - ^-5 =$ | 2. a. $^-2 \times ^-4 =$

 b. $^-8 \times 8 =$

 c. $4 \div 2 =$

 d. $^-6 \div 2 =$ | 3. Simplify the following, giving your answer in index form where appropriate.
 a. $7^5 \times 7 =$
 b. $6^8 \div 6 =$
 c. $(3^0)^7 =$ | 4. a. Simplify 49:42

 b. Divide 80 into the ratio 9:7 |
5. ✎ a. Calculate $-8\left(\frac{1}{6}\right)$ b. Calculate $-3 + \frac{13}{8}$	6. a. ✎ Convert $\frac{7}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{7}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 57.9×3.7	8. ✎ Increase 59 by 7%.
9. Simplify the following. a. $-4 - 5z - 4z$ b. $4x \times -1$	10. Simplify, give answers with positive powers. a. $(b^5)^2 =$ b. $4y^5 \times 3y^3 =$	11. a. Expand $4(6x + 5)$ b. Expand $-2(5x + 2)$	12. a. Factorise $8x - 6$ b. Factorise $-2 + 2x$
13. ✎ Substitute $x = 6$ into $2x - 6$ and evaluate.	14. ✎ Substitute $x = 32$ into $\frac{x-7}{5}$ and evaluate.	15. ✎ Substitute $x = -8$ into $-2x - 7$ and evaluate.	16. ✎ Substitute $x = \frac{1}{3}$ into $1 + 4x$ and evaluate.
17. ✎ Solve the following: $5x - 5 = 20$	18. ✎ Solve the following: $\frac{x}{7} + 1 = 7$	19. ✎ Solve the following: $3x + 3 = 2x + 6$	20. ✎ Solve the following: $21 = 5(x + 2)$

| 21. Consider the linear relationship $$y = 4x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = 4x - 3$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

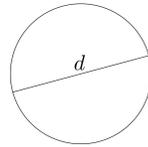| x	-1	0	1	2	3
y			-7		-19

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the volume of the rectangular prism.
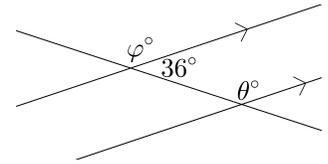

3.4m
11.6m
15.1m

$V \approx$
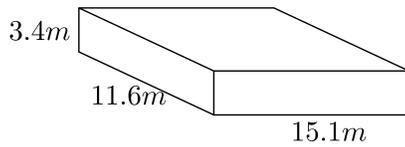
25. ✎ The circle below has a diameter of 18.8cm. Calculate the following, giving answers to 2dp. where appropriate.

a. radius =

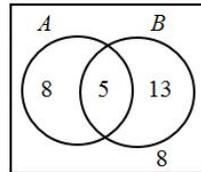b. circumference =

c. area =

26. Consider the diagram below.

a. State the size of the unknown angles.
$\theta° =$ $\qquad$ $\varphi° =$

b. What is the relationship between θ and φ?

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27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	12	15	27
D'	8	14	22
Total	20	29	49

a. P(D)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

a. P(A)=

b. P(A or B or both)=

29. ✎ Calculate the following statistics for the below data set

$$1, 8, 6, 0, 3, 7, 6$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort

★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ The height of a river is shown on a marker, with the level at which it floods marked as zero. Due to heavy rain the river changed from -3.9m to 2.1m. By how many metres had the river level changed?	31. ⊞ The expression $4^2 \times 4^3$ simplifies to: **A.** 4 **B.** 4^5 **C.** 4^6 **D.** 4^8	32. ⊞ Which number has the **largest** value? **A.** $\frac{1}{3}$ **B.** $\sqrt{0.09}$ **C.** 0.31 **D.** $(0.09)^2$
33. ✎ Calculate $-9.5 + 4.04$	34. Simplify $1 : \frac{5}{6}$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td>8</td><td></td><td></td><td></td><td>19</td></tr></table> $$y =$$
36. ✎ A number is decreased by 80% and the result is 7.4. What was the original number?	37. ✎ An arithmetic sequence begins with the numbers 7, 5, 3. What is the sum of the first 27 terms?	38. ✎ How many numbers between 1 and 100 have exactly 5 factors?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

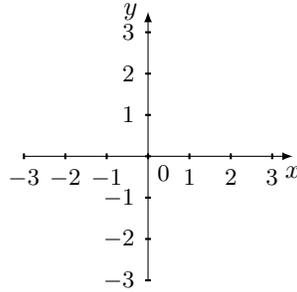|			
1. a. $^-2 - 5 =$ b. $0 + 4 =$ c. $^-1 - {}^-2 =$ d. $1 + {}^-1 =$	2. a. $^-7 \times 0 =$ b. $^-8 \times 4 =$ c. $0 \div 6 =$ d. $^-4 \div {}^-1 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(4^7)^3 =$ b. $\frac{8^8}{8^3} =$ c. $9 \times 9^6 =$	4. a. Simplify 77:70 b. Divide 50 into the ratio 3:2
5. ✎ a. Calculate $8\left(-\frac{4}{5}\right)$ b. Calculate $-5 + \frac{8}{7}$	6. a. ✎ Convert $\frac{4}{7}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{4}{7}$ a recurring or terminating decimal?	7. ✎ Evaluate 4.7×3.75	8. ✎ Decrease 67 by 6%.
9. Simplify the following. a. $-5z + z - 5z$ b. $-3 \times 3z$	10. Simplify, give answers with positive powers. a. $(a^4)^5 =$ b. $\frac{4b^6}{4b^5} =$	11. a. Expand $3(3x + 6)$ b. Expand $-3(x - 2)$	12. a. Factorise $18x - 6$ b. Factorise $-6x - 9$
13. ✎ Substitute $x = 7$ into $9x - 46$ and evaluate.	14. ✎ Substitute $x = 7$ into $8(x + 2)$ and evaluate.	15. ✎ Substitute $x = -9$ into $2x - 9$ and evaluate.	16. ✎ Substitute $x = \frac{1}{4}$ into $5 - 5x$ and evaluate.
17. ✎ Solve the following: $5x - 8 = 7$	18. ✎ Solve the following: $4 = \dfrac{x - 7}{5}$	19. ✎ Solve the following: $5x + 8 = 3x + 18$	20. ✎ Solve the following: $5(x + 1) = 22$

| 21. Consider the linear relationship $$y = -2x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad, 0)$$	22. Sketch the graph of $y = -2x + 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

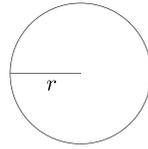| x	-1	0	1	2	3
y			8		18

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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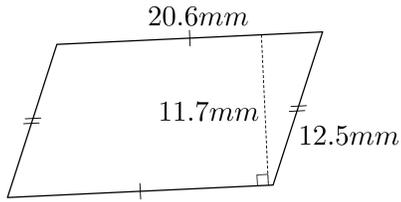
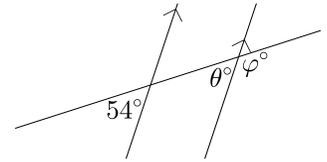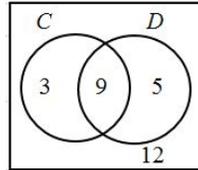| 24. ✎ To the nearest whole number calculate the area of the parallelogram. $$A \approx$$	25. ✎ The circle below has a radius of 24.8cm. Calculate the following, giving answers to 2dp. where appropriate. a. diameter = b. circumference = c. area =	26. Consider the diagram below. a. State the size of the unknown angles. $$\theta° = \qquad \varphi° =$$ b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.	28. Calculate the following probabilities using the Venn diagram below.	29. ✎ Calculate the following statistics for the below data set

27.

	A	A'	Total
C	4	14	18
C'	9	11	20
Total	13	25	38

a. P(A)=

b. P(A and C)=

28.

a. P(D)=

b. P(C or D or both)=

29.

$$3, 9, 0, 5, 9, 7, 8$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. ✎ An item costs \$16.70 and Leyla pays with a \$20 note. How much change will Leyla receive?

31. 🖩 ✎ The fraction $\frac{2}{9}$ can be expressed in decimal form as:

A. 0.222

B. 0.222...

C. 4.5

D. 4.555...

32. 🖩 ✎ $ABCD$ is a square. Therefore the value of x is:
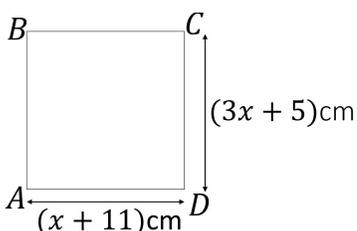
A. 1

B. 2

C. 3

D. 4

33. ✎ Calculate $-17.7 + 1.6$

34. Simplify $\frac{1}{2} : \frac{1}{2}$

35. ✎ Rearrange $ps - q = r$ to make s the subject.

36. ✎ Determine the exact value of the radius of a circle which has an circumference of 51.7cm.

37. ✎ An arithmetic sequence begins with the numbers 4, 10, 16. What is the 97th term of the sequence?

38. ✎ By placing a 1 at both ends of a number, its value is increased by 13214. What is the sum of the digits of the original number?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^{-}5 + 5 =$
 	
 b. $5 - 10 =$
 	
 c. $^{-}1 + {}^{-}4 =$
 	
 d. $^{-}3 - {}^{-}4 =$
	2. a. $4 \times {}^{-}8 =$
	
	 b. $6 \times {}^{-}2 =$
	
	 c. $^{-}2 \div {}^{-}1 =$
	
	 d. $6 \div {}^{-}2 =$
		3. Simplify the following, giving your answer in index form where appropriate.
		    a. $3^5 \times 3^3 =$
		    b. $5^8 \div 5^5 =$
		    c. $(6^7)^7 =$
			4. a. Simplify 12:2
			
			 b. Divide 3 into the ratio 1:2

5. ✎ a. Calculate $-4\left(-\frac{1}{3}\right)$ b. Calculate $-2 + \frac{13}{9}$	6. a. ✎ Convert $\frac{2}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{2}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 37.9×0.53	8. ✎ Increase 78 by 40%.
9. Simplify the following. a. $-y + 2 - 3$ b. $3a \times -2a$	10. Simplify, give answers with positive powers. a. $(b^2)^3 =$ b. $x^3 \times 5x^5 =$	11. a. Expand $3(3x - 4)$ b. Expand $-(2x + 5)$	12. a. Factorise $12x - 10$ b. Factorise $-50x - 10$
13. ✎ Substitute $x = 7$ into $6x - 34$ and evaluate.	14. ✎ Substitute $x = 3$ into $7(x - 2)$ and evaluate.	15. ✎ Substitute $x = -4$ into $3x + 8$ and evaluate.	16. ✎ Substitute $x = \frac{5}{6}$ into $2x + 1$ and evaluate.
17. ✎ Solve the following: $6x - 5 = 25$	18. ✎ Solve the following: $8 = \dfrac{x - 9}{4}$	19. ✎ Solve the following: $4x - 10 = 2x - 6$	20. ✎ Solve the following: $3x - 7 = -2x + 3$

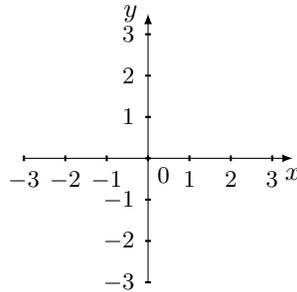| 21. Consider the linear relationship $$y = -5x + 1$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad, 0)$$	22. Sketch the graph of $y = -5x + 1$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

22 graph:

23 table:

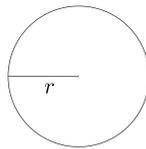| x	-1	0	1	2	3
y		2			-7

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

24. ✎ To the nearest whole number calculate the volume of the rectangular prism.

3.5m, 16.7m, 8.5m

$$V \approx$$
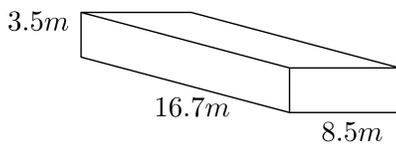
25. ✎ The circle below has a radius of 28.4cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =
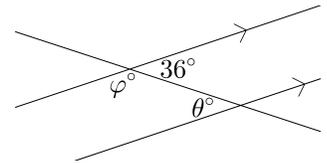
b. circumference =

c. area =

26. Consider the diagram below.

$\varphi°$ $36°$ $\theta°$

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
D	8	7	15
D'	8	5	13
Total	16	12	28

a. P(A)=

b. P(not A)=

28. Calculate the following probabilities using the Venn diagram below.

B D 6 3 7 2
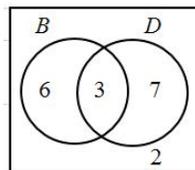
a. P(B)=

b. P(not B)=

29. ✎ Calculate the following statistics for the below data set

$$1, 9, 1, 1, 5, 6, 5$$

a. median =

b. mean =

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort

★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ Grapes at Coles are on special for \$3.50 per kilo. How much does 2.5kg of grapes cost?	31. ⊛ ✎ Decreasing 56 by 2% gives: **A.** 1.12 **B.** 11.2 **C.** 44.8 **D.** 54.88	32. ✎ A signal at a pedestrian crossing near Ellie's house stays red for 15 seconds. It then changes to green for 10 seconds. What is the probability that it will be green next time Ellie wants to use the crossing? **A.** 0.2 **B.** 0.4 **C.** 0.5 **D.** 0.6
33. ✎ Calculate $-20 + 7.1$	34. Simplify $\frac{3}{4} : 3\frac{1}{4}$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. x | -1 | 0 | 1 | 2 | 3 y | | 6 | | | -1 $y =$
36. ✎ Determine the exact value of the diameter of a circle which has an area of 29cm^2.	37. ✎ The 9th term of an arithmetic sequence is -42 and the 15th term is -78. What are the first three terms of this sequence?	38. ✎ There are 15 digits that make up the counting numbers from 1 to 12. If there are 1470 digits that make up the counting numbers from1 to n, then what is n?

x	-1	0	1	2	3
y		6			-1

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-1 + 1 =$	2. a. $^-6 \times {}^-4 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 18:14
b. $^-2 - 7 =$	b. $^-5 \times 7 =$	a. $\frac{2^8}{2^7} =$	b. Divide 15 into the ratio 1:2
c. $2 - {}^-5 =$	c. $^-2 \div 2 =$	b. $(4^2)^5 =$	
d. $^-5 + {}^-4 =$	d. $^-7 \div 1 =$	c. $8 \times 8^5 =$	

| 5. ✎ a. Calculate $8\left(-\frac{1}{2}\right)$ | 6. a. ✎ Convert $\frac{2}{3}$ to a decimal. Round to 4 decimal places where necessary. | 7. ✎ Evaluate 0.078×0.52 | 8. ✎ Decrease 94 by 60%. |
| b. Calculate $-3 + \frac{5}{4}$ | b. Is $\frac{2}{3}$ a recurring or terminating decimal? | | |

| 9. Simplify the following.
 a. $4 - 1 - 7a$

 b. $-4 \times 6x$ | 10. Simplify, give answers with positive powers.
 a. $y^3 \times y =$

 b. $y^5 \times 5y^2 =$ | 11. a. Expand $2(2x - 6)$

 b. Expand $-7(4x + 1)$ | 12. a. Factorise $15x + 15$

 b. Factorise $-10x - 8$ |

| 13. ✎ Substitute $x = 6$ into $4x - 13$ and evaluate. | 14. ✎ Substitute $x = 37$ into $\frac{x-9}{7}$ and evaluate. | 15. ✎ Substitute $x = -8$ into $-4x - 2$ and evaluate. | 16. ✎ Substitute $x = \frac{4}{9}$ into $4x - 2$ and evaluate. |

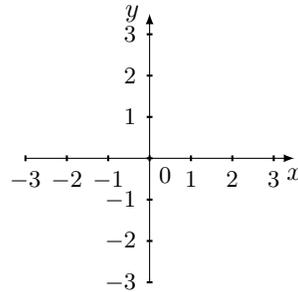| 17. ✎ Solve the following:

 $14 = 6x - 4$ | 18. ✎ Solve the following:

 $5 = \frac{x}{6} + 4$ | 19. ✎ Solve the following:

 $3x + 2 = x + 6$ | 20. ✎ Solve the following:

 $4x - 1 = -3x + 10$ |

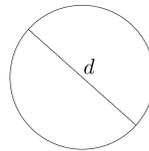| 21. Consider the linear relationship $$y = 3x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \ \ )$$ $$(\ \ , 0)$$ | 22. Sketch the graph of $y = 3x + 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

x	-1	0	1	2	3
y		-1			-19

$$y =$$

24. ✎ To the nearest whole number calculate the area of the kite.
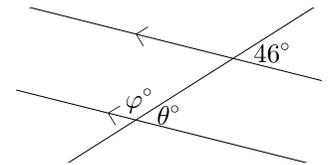

13*cm*

10*cm*

$A =$
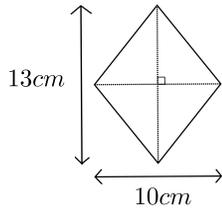
25. ✎ The circle below has a diameter of 24.4cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =
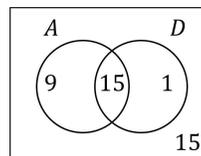
b. circumference =

c. area =

26. Consider the diagram below.

46°

$\varphi°$

$\theta°$

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	14	3	17
D'	9	5	14
Total	23	8	31

a. P(D)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

A D

9 (15) 1

15

a. P(D)=

b. P(not A)=

29. ✎ Calculate the following statistics for the below data set

$$5, 8, 4, 5, 5$$

a. median =

b. mean to 1 dp. =

c. mode =

d. range =

30. ✎ Harry runs a handyman business and gets paid $32.50 per hour. How much will he earn from completing 4 hours work?	31. ⊞ An appropriate first line of working when solving the equation $12 = 3(x + 3)$ is: **A.** $12 = x + 3$ **B.** $12 = 3x$ **C.** $9 = 3x$ **D.** $4 = x + 3$	32. ⊞ ✎ A cash prize is shared between Wendy and Mark in the ratio 3:5. If Mark receives $30 more than Wendy, how much was the total prize?
33. ✎ Calculate $6 - 12.4$	34. Simplify $1 : 1\frac{4}{5}$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. $y =$
36. ✎ A number is decreased by 70% and the result is 12.3. What was the original number?	37. ✎ The 1st term of an arithmetic sequence is 23 and the 2nd term is 16. What is the term number of -411?	38. ✎ If m and n are positive integers, what is the smallest number m can be when $1470m = n^2$?

Table for question 35:

x	-1	0	1	2	3
y	4			12	

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $4 - 9 =$ b. $^-1 + 6 =$ c. $^-6 + ^-2 =$ d. $^-6 - ^-4 =$	2. a. $7 \times ^-2 =$ b. $^-8 \times ^-7 =$ c. $0 \div 1 =$ d. $^-25 \div 5 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $4^5 \times 4^5 =$ b. $4^8 \div 4^5 =$ c. $(8^5)^2 =$	4. a. Simplify 45:9 b. Divide 39 into the ratio 12:1
5. ✎ a. Calculate $-4\left(\frac{1}{2}\right)$ b. Calculate $-3 + \frac{10}{9}$	6. a. ✎ Convert $1\frac{1}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{1}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 2.5×1.75	8. ✎ Decrease 87 by 60%.
9. Simplify the following. a. $-1 - 5 + c$ b. $-3 \times -4y$	10. Simplify, give answers with positive powers. a. $\frac{y^6}{y} =$ b. $\frac{9b^7}{3b^4} =$	11. a. Expand $3(6x - 1)$ b. Expand $-(x - 2)$	12. a. Factorise $6x - 6$ b. Factorise $-30x - 24$
13. ✎ Substitute $x = 5$ into $3x + 2$ and evaluate.	14. ✎ Substitute $x = 32$ into $\frac{x-8}{4}$ and evaluate.	15. ✎ Substitute $x = -3$ into $-8x - 3$ and evaluate.	16. ✎ Substitute $x = \frac{7}{11}$ into $-5x - 2$ and evaluate.
17. ✎ Solve the following: $3x + 6 = 18$	18. ✎ Solve the following: $\frac{x}{8} + 2 = 3$	19. ✎ Solve the following: $x - 3 = 4x - 12$	20. ✎ Solve the following: $-x + 9 = 7x + 2$

21. Consider the linear relationship

$$y = -3x - 3$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\quad , 0)$

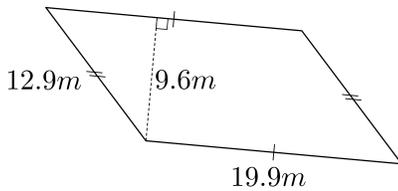22. Sketch the graph of $y = -3x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.
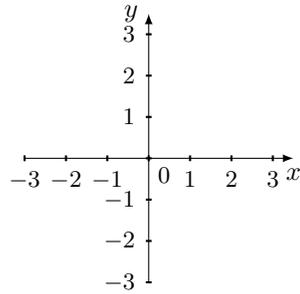
23. The points below satisfy a linear relationship. Complete the table and rule below.

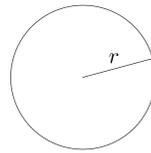| x	-1	0	1	2	3
y		1		-3	

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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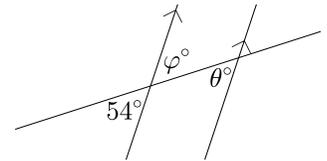24. ✎ To the nearest whole number calculate the perimeter of the parallelogram.

$12.9m$ $9.6m$

$19.9m$

$P \approx$

25. ✎ The circle below has a radius of 15.9cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =
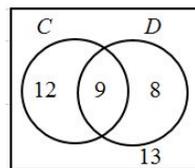
c. area =

26. Consider the diagram below.

$\varphi°$

$\theta°$

$54°$

a. State the size of the unknown angles.

$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	6	10	16
C'	6	9	15
Total	12	19	31

a. P(C)=

b. P(B and C)=

28. Calculate the following probabilities using the Venn diagram below.

C D

12 9 8

13

a. P(C)=

b. P(not D)=

29. ✎ Calculate the following statistics for the below data set

$$3, 4, 9, 9, 5, 6$$

a. median =

b. mean =

c. mode =

d. range =

30. ✎ Lucas took a bus from Melbourne to Sydney. His bus left at 8:15am and arrived at 7:50pm on the same day. How long did Lucas's bus trip take?

31. ⊞ Which statement is true about the decimal represenation of $\frac{5}{3}$:

A. The decimal is smaller than 1 and is recurring

B. The decimal is smaller than 1 and terminates

C. The decimal is bigger than 1 and is recurring

D. The decimal is bigger than 1 and terminates

32. ✎ A stack of 2 cups is 18cm tall. A stack of 4 cups is 22cm tall.

18cm 22cm
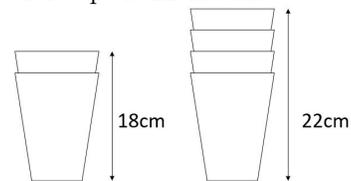
(not to scale)

Which rule can be used to work out the height, in centimetres, of a stack of n cups?

A. $4n + 10$

B. $4n + 6$

C. $2n + 14$

D. $2n + 16$

33. ✎ Calculate $-7.4 + 94.2$

34. Find the value of x that makes the following equation true.

$$10 : 7 = x : 10$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y	-1			6	

$$y =$$

36. ✎ Determine the exact value of the radius of a circle which has an circumference of 59.9cm.

37. ✎ Express $\frac{58}{9}$ as a recurring decimal

38. ✎ A 5 litre container of orange juice has 3 litres of juice removed and is filled up with water and mixed thoroughly. It then has 3 litres of mixture removed and is again filled up with water. What percentage of the final mixture is orange juice?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

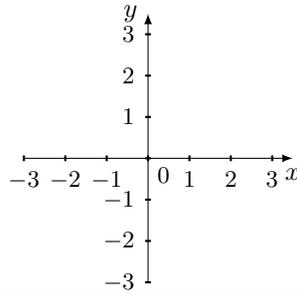|			
1. a. $^-2 + 1 =$ b. $1 - 2 =$ c. $0 - {}^-1 =$ d. $4 + {}^-3 =$	2. a. $^-7 \times {}^-6 =$ b. $^-4 \times {}^-1 =$ c. $0 \div 7 =$ d. $18 \div {}^-6 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $\frac{9^2}{9} =$ b. $(7^5)^7 =$ c. $7^6 \times 7^7 =$	4. a. Simplify 36:24 b. Divide 40 into the ratio 3:1
5. ✎ a. Calculate $-5\left(-\frac{1}{3}\right)$ b. Calculate $\frac{8}{3} - 2$	6. a. ✎ Convert $2\frac{3}{10}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{3}{10}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.456×0.38	8. ✎ Decrease 51 by 7%.
9. Simplify the following. a. $-y + 6y + 6$ b. $-2x \times -6x$	10. Simplify, give answers with positive powers. a. $\frac{y^5}{y^3} =$ b. $2x^5 \times 2x =$	11. a. Expand $4(5x - 1)$ b. Expand $-10(x - 4)$	12. a. Factorise $24x + 20$ b. Factorise $-2x - 10$
13. ✎ Substitute $x = 4$ into $5x - 15$ and evaluate.	14. ✎ Substitute $x = 41$ into $\frac{x+8}{7}$ and evaluate.	15. ✎ Substitute $x = -7$ into $-2x - 10$ and evaluate.	16. ✎ Substitute $x = \frac{2}{3}$ into $4 - 5x$ and evaluate.
17. ✎ Solve the following: $9 + 4x = 33$	18. ✎ Solve the following: $6 = 3(x - 1)$	19. ✎ Solve the following: $5x - 6 = 3x + 6$	20. ✎ Solve the following: $19 = 5(x - 4)$

| 21. Consider the linear relationship $$y = -2x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \ \ )$$ $$(\ , 0)$$	22. Sketch the graph of $y = -2x + 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

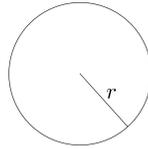| x	-1	0	1	2	3
y			-3		-7

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator
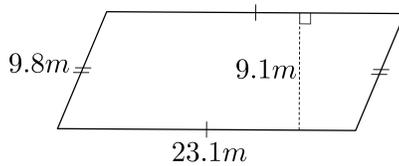
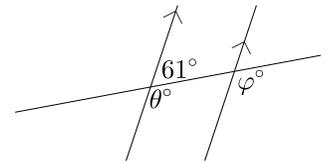| 24. ✎ To the nearest whole number calculate the perimeter of the parallelogram. $$P \approx$$	25. ✎ The circle below has a radius of 3.9cm. Calculate the following, giving answers to 2dp. where appropriate. a. diameter = b. circumference = c. area =	26. Consider the diagram below. a. State the size of the unknown angles. $$\theta° = \qquad \varphi° =$$ b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.					28. Calculate the following probabilities using the Venn diagram below.	29. ✎ Calculate the following statistics for the below data set

27.

	A	A'	Total
C	6	13	19
C'	5	13	18
Total	11	26	37

a. P(A)=

b. P(A and C)=

28.

a. P(C)=

b. P(not C)=

29. $$4, 5, 9, 6, 6, 2$$

a. median =

b. mean to 1 dp. ≈

c. mode =

d. range =

30. What time is shown on the clock?

A. 3:55

B. 4:05

C. 4:55

D. 11:20

31. The median of the data set below is:

$$2, 8, 5, 4, 0$$

A. 3.8

B. 4

C. 4.5

D. 5

32. ✎ A corner table has the shape of a quarter circle. The two straight sides are 70cm long.
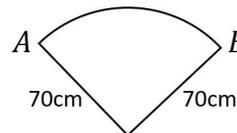
The curved distance from A to B is closest to

A. 70cm

B. 90cm

C. 110cm

D. 130cm

33. Calculate $(-2)^4$

34. Find the value of x that makes the following equation true.

$$11 : 12 = 9 : x$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y	4		9		

$$y =$$

36. ✎ A number is decreased by 40% and the result is 15.6. What was the original number?

37. ✎ An arithmetic sequence begins with the numbers 2, 8, 14. What is the 98th term of the sequence?

38. ✎ Henry wrote a list of all the numbers that could be produced by changing one digit of the number 300. How many of the numbers on Henry's list are prime?

| mathsquad | Key Skills Training Level 3+ | Name: |
| | Sheet 9 | Due date: |

1. a. $^-1 - 5 =$ b. $^-3 + 7 =$ c. $3 - {}^-5 =$ d. $^-3 + {}^-1 =$	2. a. $^-6 \times 6 =$ b. $^-3 \times 8 =$ c. $10 \div 2 =$ d. $^-15 \div 3 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $5^5 \times 5^7 =$ b. $5^6 \div 5^5 =$ c. $(4^8)^2 =$	4. a. Simplify 24:60 b. Divide 56 into the ratio 1:6
5. ✎ a. Calculate $7\left(-\frac{1}{10}\right)$ b. Calculate $-2 + \frac{3}{2}$	6. a. ✎ Convert $\frac{8}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{8}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.85×5.9	8. ✎ Decrease 14 by 80%.
9. Simplify the following. a. $-2y + 3y - 3$ b. $-1 \times 1c$	10. Simplify, give answers with positive powers. a. $(x^2)^5 =$ b. $(3s^2)^4 =$	11. a. Expand $4(4x + 1)$ b. Expand $-10(3x - 1)$	12. a. Factorise $4x + 20$ b. Factorise $-3x - 3$
13. ✎ Substitute $x = 3$ into $4x - 11$ and evaluate.	14. ✎ Substitute $x = 56$ into $\frac{x}{7} - 4$ and evaluate.	15. ✎ Substitute $x = -5$ into $2x - 6$ and evaluate.	16. ✎ Substitute $x = \frac{3}{5}$ into $5x + 4$ and evaluate.
17. ✎ Solve the following: $6x + 4 = 34$	18. ✎ Solve the following: $\frac{x + 28}{7} = 9$	19. ✎ Solve the following: $4x + 10 = 2x + 22$	20. ✎ Solve the following: $6x - 9 = -3x + 5$

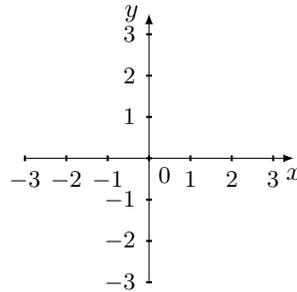|		
21. Consider the linear relationship $$y = 2x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad, 0)$$	22. Sketch the graph of $y = 2x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

For Question 23:

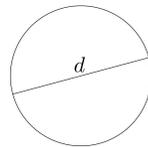| x	-1	0	1	2	3
y		1		9	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

24. ✎ To the nearest whole number calculate the area of the trapezium.

12*cm*

10*cm*

23*cm*

$A =$
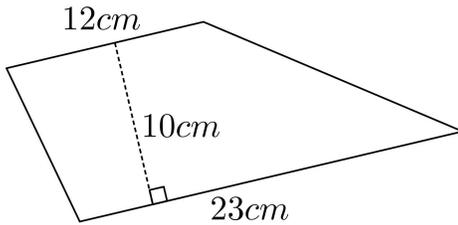
25. ✎ The circle below has a diameter of 29.8cm. Calculate the following, giving answers to 2dp. where appropriate.

a. radius =

b. circumference =

c. area =

26. Consider the diagram below.

a. State the size of the unknown angles.
   $\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	3	3	6
C'	3	11	14
Total	6	14	20

a. P(C)=

b. P(not A)=

28. Calculate the following probabilities using the Venn diagram below.

a. P(A)=
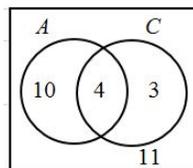
b. P(not C)=

29. ✎ Calculate the following statistics for the below data set

$$7, 1, 6, 2, 2, 4, 0$$

a. median =

b. mean to 1 dp. ≈

c. mode =

d. range =

30. ✎ On special, a packet of pasta costs 97c. How much does 7 bags cost?	31. ⊛ ✎ Substituting $x = 3$ into $\frac{x+9}{3}$ and evaluating gives: **A.** 4 **B.** 6 **C.** 10 **D.** 13	32. ✎ What number is halfway between $\frac{4}{7}$ and $\frac{5}{7}$?

33. ✎ Calculate $-\frac{1}{2} - \frac{3}{12}$

34. Simplify $1.2 : 0.6$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			1		-2

$$y = $$

36. ✎ Determine the exact value of the radius of a circle which has an area of 41cm^2.

37. ✎ The 1st term of an arithmetic sequence is 5 and the 2nd term is 2. What is the term number of -268?

38. ✎ Sally thinks of three numbers. They are added in pairs and the results are 103, 114 and 133. What are the three numbers Sally thought of?

| Key Skills Training Level 3+ | Name: |
| Sheet 10 | Due date: |

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

| 1. a. $6 - 10 =$

 b. $^-1 + 5 =$

 c. $^-3 - ^-6 =$

 d. $2 + ^-5 =$ | 2. a. $2 \times ^-1 =$

 b. $3 \times ^-8 =$

 c. $^-6 \div 6 =$

 d. $^-20 \div ^-5 =$ | 3. Simplify the following, giving your answer in index form where appropriate.
 a. $(8^8)^7 =$
 b. $\frac{4^8}{4^4} =$
 c. $4^2 \times 4^6 =$ | 4. a. Simplify 36:6

 b. Divide 84 into the ratio 11:1 |
5. ✎ a. Calculate $4\left(-\frac{9}{11}\right)$ b. Calculate $-\frac{8}{5} - 2$	6. a. ✎ Convert $2\frac{7}{10}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{7}{10}$ a recurring or terminating decimal?	7. ✎ Evaluate 46.6×5.2	8. ✎ Increase 63 by 4%.
9. Simplify the following. a. $5z - z - 3z$ b. $-2 \times -4b$	10. Simplify, give answers with positive powers. a. $y^5 \times y^2 =$ b. $\frac{10b^7}{6b^5} =$	11. a. Expand $4(5x - 4)$ b. Expand $-12(5x - 1)$	12. a. Factorise $6x + 8$ b. Factorise $-7 - 14x$
13. ✎ Substitute $x = 6$ into $6x - 23$ and evaluate.	14. ✎ Substitute $x = 36$ into $\frac{x}{9} + 5$ and evaluate.	15. ✎ Substitute $x = -6$ into $3 - 7x$ and evaluate.	16. ✎ Substitute $x = \frac{1}{2}$ into $2x + 4$ and evaluate.
17. ✎ Solve the following: $2x + 6 = 16$	18. ✎ Solve the following: $\frac{x - 3}{9} = 7$	19. ✎ Solve the following: $3x + 6 = 2x + 9$	20. ✎ Solve the following: $6(x - 1) = 28$

21. Consider the linear relationship

$$y = 4x - 2$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$$(0, \quad)$$

$$(\quad , 0)$$

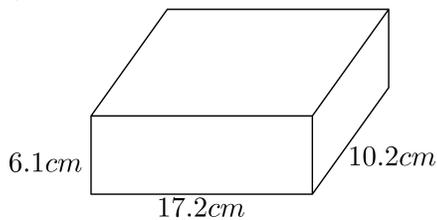22. Sketch the graph of $y = 4x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.
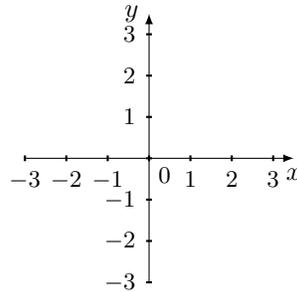
23. The points below satisfy a linear relationship. Complete the table and rule below.

x	-1	0	1	2	3
y	-6			6	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the volume of the rectangular prism.

6.1cm

17.2cm

10.2cm

$V \approx$

25. ✎ The circle below has a diameter of 18.6cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =

c. area =

26. Consider the diagram below.

61° $\varphi°$
$\theta°$

a. State the size of the unknown angles.
   $\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	9	14	23
C'	8	3	11
Total	17	17	34

a. P(C)=

b. P(B and C)=

28. Calculate the following probabilities using the Venn diagram below.

A C
8 10 5
10

a. P(A)=

b. P(A or C or both)=

29. ✎ Calculate the following statistics for the below data set

$$6, 3, 2, 7, 0$$

a. median =

b. mean to 1 dp. =

c. mode =

d. range =

30. ✎ Swimming pool entry costs $2.80 per child. How many children can entre for $20?

A. 6

B. 7

C. 8

D. 56

31. ⊞ ✎ The value of $3 + \frac{15}{3}$ is:

A. 1

B. 6

C. 8

D. 15

32. Rods are used to make this pattern of hexagons.
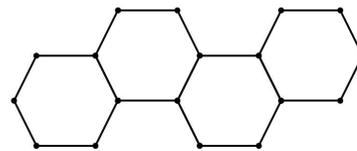
If n is the number of hexagons in the pattern, then the rule for the number of rods is

A. $6n$

B. $5n$

C. $6n - 1$

D. $5n + 1$

33. ✎ Calculate $-81.86 - 76.05$

34. Simplify $0.45 : 0.15$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			4		9

$$y =$$

36. ✎ Determine the exact value of the diameter of a circle which has an area of 50cm^2.

37. ✎ Express $3.1\overline{3}$ as an improper fraction

38. ✎ What is the sum of the digits in the numbers from 1 to 50?

MULTIPLICATION GRID

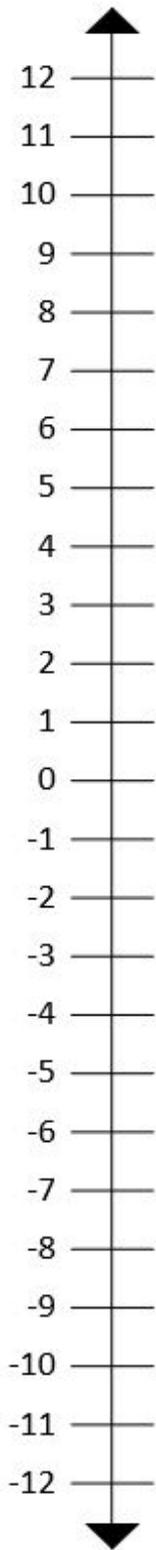| ×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

PRIME NUMBERS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12

mathsquad

BOOK 2

Key Skills Training - L3+

name: _____

Welcome to the Key Skills Training Program for Schools. These sheets are designed to give you multiple opportunities to learn and revise key mathematical skills. Completing these sheets will help you become equipped with the skills you need to be a successful user of mathematics in school and also every day life. The following points will help you get the most out of the program. Enjoy!

- When you see the ✎ symbol include some working to support your answer. This could involve a calculation, annotating a diagram or an explanation of your thought process.

- All fractional answers must be given in simplified form.

- You may be able to complete very few questions or almost all of them, it doesn't matter. As long as you give your best effort and try to improve each time you are maximising your success!

- If you feel that some or all of these questions aren't suitable for you, have a chat with your teacher.

Time to get started on Sheet 1. Turn the page and complete the questions on pages 2, 3 and 4.

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

---

1. a. $^-2 - 4 =$

b. $^-2 + 6 =$

c. $3 - {}^-1 =$

d. $^-1 + {}^-1 =$

2. a. $4 \times {}^-3 =$

b. $^-6 \times 3 =$

c. $8 \div {}^-8 =$

d. $^-6 \div 2 =$

3. Simplify the following, giving your answer in index form where appropriate.

a. $(6^2)^6 =$

b. $\frac{7^2}{7^2} =$

c. $2^5 \times 2^4 =$

4. a. Simplify 3:9

b. Divide 70 into the ratio 9:5

---

5. ✎ a. Calculate $-8\left(-\frac{2}{3}\right)$

b. Calculate $-2 + \frac{4}{3}$

6. a. ✎ Convert $\frac{5}{7}$ to a decimal. Round to 4 decimal places where necessary.

b. Is $\frac{5}{7}$ a recurring or terminating decimal?

7. ✎ Evaluate 4.96×14

8. ✎ Increase 56 by 30%.

---

9. Simplify the following.

a. $-2 - 7x + x$

b. $4y \times -6$

10. Simplify, give answers with positive powers.

a. $\frac{y^8}{y^2} =$

b. $(2s^4)^2 =$

11. a. Expand $2(4x - 4)$

b. Expand $-8(4x - 5)$

12. a. Factorise $4x - 10$

b. Factorise $-4 - 4x$

---

13. ✎ Substitute $x = 6$ into $6x + 9$ and evaluate.

14. ✎ Substitute $x = 2$ into $8(x + 3)$ and evaluate.

15. ✎ Substitute $x = -3$ into $-5x - 2$ and evaluate.

16. ✎ Substitute $x = \frac{5}{6}$ into $3x + 4$ and evaluate.

---

17. ✎ Solve the following:

$$8 = 9x - 28$$

18. ✎ Solve the following:

$$7 = \frac{x + 6}{3}$$

19. ✎ Solve the following:

$$5x - 10 = 4x - 4$$

20. ✎ Solve the following:

$$3(x + 6) = 16$$

2

21. Consider the linear relationship	22. Sketch the graph of $y = 3x - 2$.	23. The points below satisfy a linear

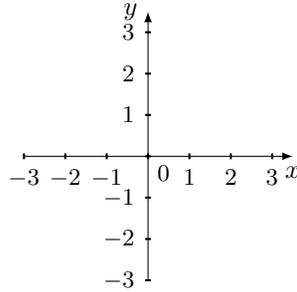21. Consider the linear relationship

$$y = 3x - 2$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\quad , 0)$

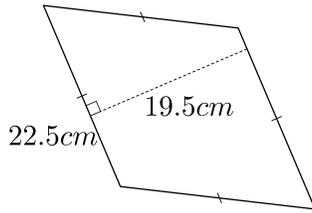22. Sketch the graph of $y = 3x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.

23. The points below satisfy a linear relationship. Complete the table and rule below.

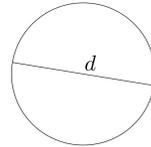| x	-1	0	1	2	3
y		-4			-19

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

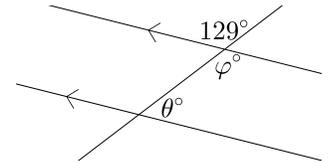24. ✎ To the nearest whole number calculate the perimeter of the rhombus.

$P =$

25. ✎ The circle below has a diameter of 24.6cm. Calculate the following, giving answers to 2dp. where appropriate.

a. radius =

b. circumference =

c. area =

26. Consider the diagram below.

a. State the size of the unknown angles.

$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	13	14	27
C'	14	4	18
Total	27	18	45

a. P(B)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.
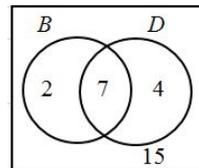
a. P(D)=

b. P(B or D or both)=

29. ✎ Calculate the following statistics for the below data set

$$5, 0, 9, 7, 4, 4$$

a. median =

b. mean to 1 dp. ≈

c. mode =

d. range =

3

Step 3: ★ Complete the challenge questions below with your best effort
★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ When on special, you can buy 5 bags of pasta for $4.85. What is the price of 1 bag?

31. ⊕ Which rule connects the points in the table below?

x	-1	0	1	2	3	4
y		2			-7	

A. $y = 9x + 2$
B. $y = 3x - 2$
C. $y = -3x + 2$
D. $y = -9x - 2$

32. A ticket costs $65. A fee of 10% is added to the price. Which calculation will give the new price?
A. $65 + 10$
B. $65 \div 0.1$
C. 65×0.1
D. 65×1.1

33. ✎ Calculate $-\frac{6}{9} - \frac{1}{2}$

34. Simplify $0.6 : 2.2$

35. ✎ Rearrange $e(h + f) = g$ to make h the subject.

36. ✎ A number is decreased by 80% and the result is 5. What was the original number?

37. ✎ Express $\frac{106}{16}$ as a terminating decimal

38. ✎ How many ways are there of walking up a flight of 12 stairs if you can take either one or three stairs with each step?

4

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-1 + 4 =$ b. $^-2 - 3 =$ c. $^-1 + {}^-3 =$ d. $^-2 - {}^-4 =$	2. a. $^-8 \times {}^-3 =$ b. $^-3 \times 3 =$ c. $^-56 \div 8 =$ d. $^-8 \div {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(6^4)^2 =$ b. $\frac{8^6}{8^6} =$ c. $6^4 \times 6^3 =$	4. a. Simplify 72:9 b. Divide 64 into the ratio 3:5
5. ✎ a. Calculate $-2\left(-\frac{2}{9}\right)$ b. Calculate $2 - \frac{5}{3}$	6. a. ✎ Convert $1\frac{3}{4}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{3}{4}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.565×1.7	8. ✎ Increase 80 by 80%.
9. Simplify the following. a. $6 + 3a + 6$ b. $-5x \times -7$	10. Simplify, give answers with positive powers. a. $(y^3)^4 =$ b. $\frac{b^5}{4b^4} =$	11. a. Expand $2(5x + 3)$ b. Expand $-6(4x + 4)$	12. a. Factorise $12x - 6$ b. Factorise $-4 + 2x$
13. ✎ Substitute $x = 2$ into $4x - 1$ and evaluate.	14. ✎ Substitute $x = 7$ into $\frac{x+5}{2}$ and evaluate.	15. ✎ Substitute $x = 4$ into $7 - 3x$ and evaluate.	16. ✎ Substitute $x = \frac{2}{7}$ into $4 - 2x$ and evaluate.
17. ✎ Solve the following: $6 = 2x + 2$	18. ✎ Solve the following: $7 = 7(x - 1)$	19. ✎ Solve the following: $3x - 2 = 2x + 4$	20. ✎ Solve the following: $6x - 7 = 7x - 7$

| 21. Consider the linear relationship $$y = 5x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = 5x + 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23 table:
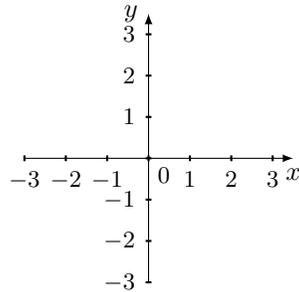
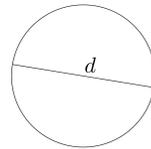| x	-1	0	1	2	3
y		4		-8	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the perimeter of the parallelogram.
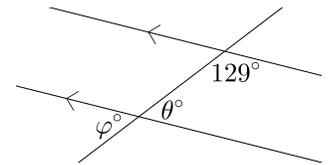
19.8mm

9mm

12.2mm

$P =$
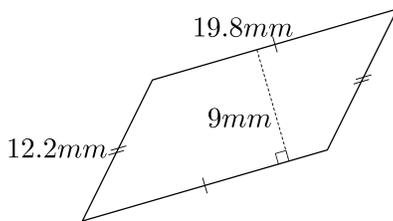
25. ✎ The circle below has a diameter of 29.6cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =

c. area =

26. Consider the diagram below.

129°

$\theta°$

$\varphi°$

a. State the size of the unknown angles.
  $\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	14	13	27
D'	11	15	26
Total	25	28	53

a. P(C)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

B D

4   15   11

5

a. P(B)=

b. P(B or D or both)=

29. ✎ Calculate the following statistics for the below data set

$$1, 8, 3, 8, 6, 6, 5$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. ✎ At Woolworths 8 bunches of asparagus $12. How much does each bunch of asparagus cost?

A. $0.67

B. $1.50

C. $6

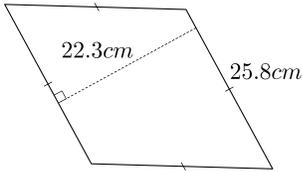**D.** $20

31. ✎ The area of the rhombus below, rounded to the nearest whole number is:

22.3cm

25.8cm

A. 103cm^2

B. 550cm^2

C. 575cm^2

D. 666cm^2

32. ✎ The amount of energy, E units, used by an air-conditioner for temperatures in the range 20°C to 30 °C is given by the rule $E = 2T^2$ where T is the temperature in °C. How many units of energy are used when the temperature of the air-conditioner is 23°C?

33. ✎ Calculate $3.22 - 4.2$

34. Find the value of x that makes the following equation true.

$$10 : 12 = 2 : x$$

35. ✎ Rearrange $g = eh + f$ to make h the subject.

36. ✎ Determine the exact value of the diameter of a circle which has an circumference of 57.5cm.

37. ✎ An arithmetic sequence begins with the numbers 3, 10, 17. What is the sum of the first 26 terms?

38. ✎ Joe is under 30 and has two children under 10. The product of Joe's age with his children's ages is 870. How old are Joe and his children?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-4 + 4 =$ b. $^-2 - 6 =$ c. $^-3 - {}^-4 =$ d. $^-5 + {}^-1 =$	2. a. $^-6 \times 2 =$ b. $2 \times {}^-8 =$ c. $49 \div 7 =$ d. $32 \div {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $7^2 \times 7^7 =$ b. $(6^6)^5 =$ c. $7^6 \div 7^5 =$	4. a. Simplify 22:16 b. Divide 119 into the ratio 11:6
5. ✎ a. Calculate $-5\left(\frac{5}{7}\right)$ b. Calculate $\frac{5}{3} - 4$	6. a. ✎ Convert $\frac{1}{8}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{1}{8}$ a recurring or terminating decimal?	7. ✎ Evaluate 57.6×0.16	8. ✎ Decrease 95 by 80%.
9. Simplify the following. a. $-7a - 2 - 4a$ b. $-7x \times -5x$	10. Simplify, give answers with positive powers. a. $\frac{y^4}{y} =$ b. $4b^2 \times 2b^5 =$	11. a. Expand $4(x - 5)$ b. Expand $-(4x - 4)$	12. a. Factorise $8x + 8$ b. Factorise $-10 - 4x$
13. ✎ Substitute $x = 3$ into $2x - 4$ and evaluate.	14. ✎ Substitute $x = 24$ into $\frac{x}{6} - 3$ and evaluate.	15. ✎ Substitute $x = 9$ into $-5x - 7$ and evaluate.	16. ✎ Substitute $x = \frac{8}{9}$ into $2 - 3x$ and evaluate.
17. ✎ Solve the following: $34 = 6x - 2$	18. ✎ Solve the following: $6 = \dfrac{x + 16}{3}$	19. ✎ Solve the following: $2x - 1 = 6x - 9$	20. ✎ Solve the following: $5(x - 3) = 24$

| 21. Consider the linear relationship | 22. Sketch the graph of $y = 3x + 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

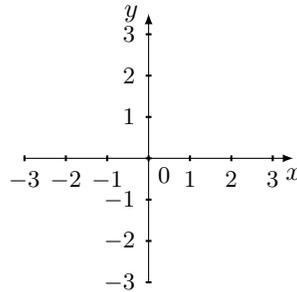**21.** Consider the linear relationship

$$y = 3x + 2$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$$(0, \quad)$$

$$(\quad, 0)$$

22. Sketch the graph of $y = 3x + 2$. Label the axis intercepts using your answers from Question 21 to assist you.
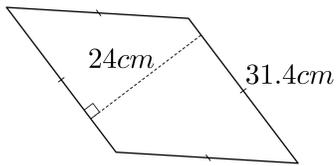

23. The points below satisfy a linear relationship. Complete the table and rule below.

x	-1	0	1	2	3
y		-4			11

$$y =$$

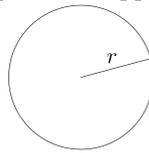**Step 2:** ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the perimeter of the rhombus.

24cm · 31.4cm

$P \approx$

25. ✎ The circle below has a radius of 6.6cm. Calculate the following, giving answers to 2dp. where appropriate.

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

$\theta°$
$\varphi°$
133°

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

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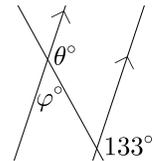
27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	11	12	23
C'	14	4	18
Total	25	16	41

a. P(C)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

B C
10 1 7
8

a. P(B)=
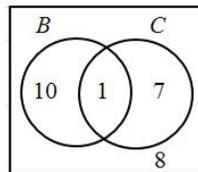
b. P(B or C or both)=

29. ✎ Calculate the following statistics for the below data set

$$4, 5, 0, 7, 5$$

a. median =

b. mean to 1 dp. =

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort		
★ You may use a calculator on questions 30-32 unless otherwise stated		

30. ✎ How many seconds are there is 7 minutes and 40 seconds?	31. ⊛ Evaluating $3 \times \left(-\frac{5}{6}\right)$ gives: **A.** $2\frac{1}{6}$ **B.** $-2\frac{1}{6}$ **C.** $-\frac{15}{18}$ **D.** $-2\frac{1}{2}$	32. The list below shows the number of books that the eight members of a book club read in 2018. $$4, 4, 6, 9, 10, 13, 13, 13$$ Which of the following statements is true? **A.** mean > median = mode **B.** mean < median < mode **C.** mean = median = mode **D.** mean = median < mode
33. Calculate $(-3)^1$	34. Simplify $3\frac{1}{2} : 1$	35. ✎ Rearrange $eh + f = g$ to make h the subject.
36. ✎ A number is decreased by 90% and the result is 4.9. What was the original number?	37. ✎ The 7th term of an arithmetic sequence is -30 and the 12th term is -60. What are the first three terms of this sequence?	38. ✎ What is the first time after 3 o'clock that the hands of the clock make an angle of 35 degrees?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-5 - 1 =$ b. $^-1 + 2 =$ c. $^-2 + ^-6 =$ d. $3 - ^-2 =$	2. a. $^-3 \times 5 =$ b. $^-8 \times ^-4 =$ c. $4 \div 4 =$ d. $9 \div ^-3 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(9^2)^0 =$ b. $\frac{6^8}{6^5} =$ c. $8^3 \times 8^5 =$	4. a. Simplify 70:90 b. Divide 35 into the ratio 3:2
5. ✎ a. Calculate $4\left(-\frac{2}{3}\right)$ b. Calculate $\frac{5}{2} - 3$	6. a. ✎ Convert $\frac{5}{8}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{5}{8}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.46×27.8	8. ✎ Increase 76 by 4%.
9. Simplify the following. a. $-6a - 4 - 3$ b. $4x \times 6x$	10. Simplify, give answers with positive powers. a. $(a^4)^2 =$ b. $4y^2 \times 5y^3 =$	11. a. Expand $2(x - 2)$ b. Expand $-2(5x - 2)$	12. a. Factorise $12x - 4$ b. Factorise $-30 + 20x$
13. ✎ Substitute $x = 6$ into $3x - 11$ and evaluate.	14. ✎ Substitute $x = 6$ into $7(x + 3)$ and evaluate.	15. ✎ Substitute $x = 5$ into $6 - 3x$ and evaluate.	16. ✎ Substitute $x = \frac{4}{5}$ into $-4x - 4$ and evaluate.
17. ✎ Solve the following: $8 + 9x = 26$	18. ✎ Solve the following: $\frac{x}{2} + 1 = 2$	19. ✎ Solve the following: $x + 8 = 2x + 5$	20. ✎ Solve the following: $5(x + 4) = 16$

21. Consider the linear relationship $$y = 4x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$	22. Sketch the graph of $y = 4x + 3$. Label the axis intercepts using your answers from Question 21 to assist you. 	23. The points below satisfy a linear relationship. Complete the table and rule below. | x	-1	0	1	2	3
y		-1		-9	| $$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

| 24. ✎ To the nearest whole number calculate the area of the trapezium.

10cm

11cm

17cm

$A \approx$ | 25. ✎ The circle below has a radius of 20.9cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area = | 26. Consider the diagram below.

$60°$
$\theta°$
$\varphi°$

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ? |
27. Calculate the following probabilities using the two-way table below. |	B	B'	Total
C	4	8	12
C'	10	15	25
Total	14	23	37 | a. P(C)= b. P(not C)=	28. Calculate the following probabilities using the Venn diagram below. A B 13 12 4 3 a. P(B)= b. P(A or B or both)=	29. ✎ Calculate the following statistics for the below data set $$1, 1, 6, 2, 0, 6, 7$$ a. median = b. mean to 1 dp. $\approx$ c. mode = d. range =

15

30. ✎ The height of a stack of DVDs is 70.8mm. Each DVD has a thickness of 1.2mm. How many DVDs are in the stack?

31. ✎ The volume of the triangular prism below, rounded to the nearest whole number is:

14.4cm 10.9cm 10.2cm 14cm 12.7cm
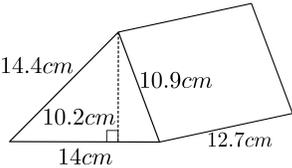
A. 907cm^3
B. 969cm^3
C. 1814cm^3
D. 284656cm^3

32. ✎ In the figure below, the lines m and n are parallel.
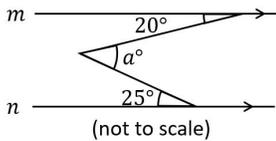
m 20° $a°$ n 25°
(not to scale)

What is the value of a?

33. ✎ Calculate $-97.8 - 58.8$

34. Simplify $8 : 0.8$

35. ✎ Rearrange $\frac{h}{e} - f = g$ to make e the subject.

36. ✎ A number is decreased by 90% and the result is 9.7. What was the original number?

37. ✎ The 15th term of an arithmetic sequence is 42 and the 27th term is 66. What are the first three terms of this sequence?

38. ✎ $34650p$ is a perfect square. What is the smallest value that p could take?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-3 + 7 =$ b. $^-2 - 4 =$ c. $^-4 + {}^-1 =$ d. $^-6 - {}^-6 =$	2. a. $^-2 \times {}^-2 =$ b. $^-1 \times 8 =$ c. $49 \div 7 =$ d. $0 \div {}^-3 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $8^6 \times 8^3 =$ b. $(5^2)^3 =$ c. $5^8 \div 5^7 =$	4. a. Simplify 10:15 b. Divide 110 into the ratio 10:1
5. ✎ a. Calculate $-8\left(\frac{6}{7}\right)$ b. Calculate $-\frac{7}{5} - 2$	6. a. ✎ Convert $\frac{2}{9}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{2}{9}$ a recurring or terminating decimal?	7. ✎ Evaluate 2.56×0.17	8. ✎ Decrease 26 by 70%.
9. Simplify the following. a. $-c - 5c + 5c$ b. $4 \times 1a$	10. Simplify, give answers with positive powers. a. $\frac{a^7}{a^4} =$ b. $(y^2)^2 =$	11. a. Expand $2(3x - 5)$ b. Expand $-(4x + 2)$	12. a. Factorise $8x + 12$ b. Factorise $-9 + 9x$
13. ✎ Substitute $x = 4$ into $5x + 5$ and evaluate.	14. ✎ Substitute $x = 4$ into $5(x - 3)$ and evaluate.	15. ✎ Substitute $x = -6$ into $3 + 8x$ and evaluate.	16. ✎ Substitute $x = \frac{3}{4}$ into $4x - 3$ and evaluate.
17. ✎ Solve the following: $2x - 5 = 3$	18. ✎ Solve the following: $\frac{x + 16}{8} = 3$	19. ✎ Solve the following: $2x + 9 = 3x + 7$	20. ✎ Solve the following: $5(x - 10) = 14$

| 21. Consider the linear relationship $$y = 3x + 1$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = 3x + 1$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |
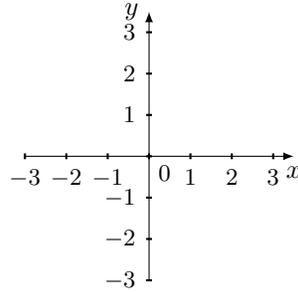
23 table:

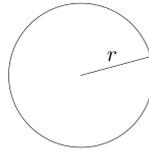| x	-1	0	1	2	3
y			1		9

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✏ To the nearest whole number calculate the area of the parallelogram.

8.6cm

9.6cm   20.3cm

$A \approx$
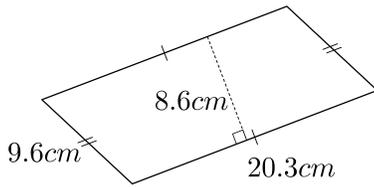
25. ✏ The circle below has a radius of 6.8cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =
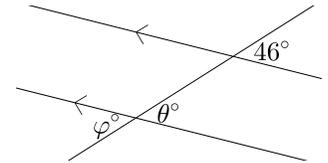
b. circumference =

c. area =

26. Consider the diagram below.

46°

$\varphi°$ $\theta°$

a. State the size of the unknown angles.

$\theta° =$ \qquad $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	7	13	20
D'	15	2	17
Total	22	15	37

a. P(C)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

C \qquad D

2 \quad 6 \quad 4

4

a. P(D)=
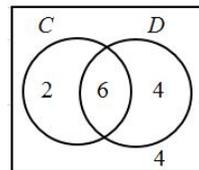
b. P(not D)=

29. ✏ Calculate the following statistics for the below data set

$$9, 8, 1, 1, 1, 5, 3, 1$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. What time is shown on the clock?

A. 12:07

B. 12:35

C. 7:00

D. 7:12

31. ⊕ The lowest common multiple of 6 and 15 is:

A. 3

B. 21

C. 30

D. 90

32. ⊕ ✎ When $m = 3$ and $n = -3$, what is the value of $m^2 + n^2$?

33. Calculate $(-5)^1$

34. Simplify $3\frac{1}{2} : 3\frac{1}{2}$

35. ✎ Rearrange $q + ps = r$ to make s the subject.

36. ✎ Determine the exact value of the radius of a circle which has an circumference of 51.3cm.

37. ✎ The 1st term of an arithmetic sequence is 5 and the 2nd term is 8. What is the term number of 215?

38. ✎ What is the largest possible remainder when a two digit number is divided by the sum of its digits?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-3 + 4 =$ b. $^-4 - 1 =$ c. $^-3 + {}^-1 =$ d. $^-4 - {}^-5 =$	2. a. $^-6 \times 3 =$ b. $5 \times {}^-3 =$ c. $16 \div 8 =$ d. $7 \div {}^-1 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $2^5 \times 2^3 =$ b. $8^7 \div 8^3 =$ c. $(5^2)^3 =$	4. a. Simplify 30:25 b. Divide 14 into the ratio 4:3
5. ✎ a. Calculate $6\left(-\frac{1}{9}\right)$ b. Calculate $-5 - \frac{8}{5}$	6. a. ✎ Convert $\frac{4}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{4}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 3.78×0.41	8. ✎ Decrease 49 by 20%.
9. Simplify the following. a. $4 + 4z - z$ b. $6 \times -2a$	10. Simplify, give answers with positive powers. a. $a^4 \times a^3 =$ b. $\frac{12b^8}{20b^7} =$	11. a. Expand $3(6x - 3)$ b. Expand $-5(5x - 3)$	12. a. Factorise $12x - 8$ b. Factorise $-24 - 18x$
13. ✎ Substitute $x = 6$ into $8x - 33$ and evaluate.	14. ✎ Substitute $x = 16$ into $\frac{x}{4} + 6$ and evaluate.	15. ✎ Substitute $x = 2$ into $-6x - 6$ and evaluate.	16. ✎ Substitute $x = \frac{1}{3}$ into $-2x - 5$ and evaluate.
17. ✎ Solve the following: $29 = 3x + 8$	18. ✎ Solve the following: $9 = \frac{x}{4} - 1$	19. ✎ Solve the following: $4x + 7 = x + 16$	20. ✎ Solve the following: $3(x - 10) = 11$

| 21. Consider the linear relationship $$y = -x + 1$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad, 0)$$	22. Sketch the graph of $y = -x + 1$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.
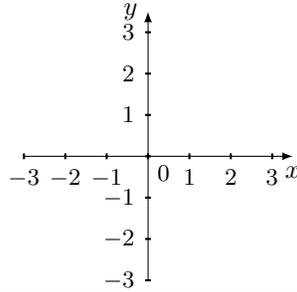
22.

23.

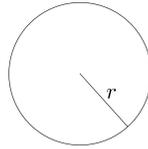| x	-1	0	1	2	3
y		-3		-15	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the volume of the rectangular prism.
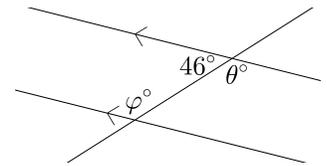

7.2cm

9.3cm

11.3cm

$V \approx$
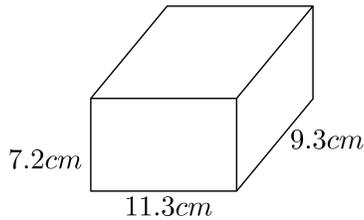
25. ✎ The circle below has a radius of 3.6cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

46° $\theta°$

$\varphi°$

a. State the size of the unknown angles.

$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	10	12	22
D'	1	2	3
Total	11	14	25

a. P(C)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

B C

10 13 10

4
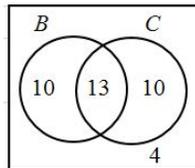
a. P(B)=

b. P(B and C)=

29. ✎ Calculate the following statistics for the below data set

$$0, 8, 9, 0, 5, 9, 7, 9$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. ✎ 75 students were asked if they have Netflix, Stan or both. The results are shown in the table below. How many students had Netflix?

	Netflix	No Netflix
Stan	31	8
No Stan	9	27

31. ⊕ The ratio 27:21 simplifies to:

A. 7:1

B. 6:1

C. 2.7:2.1

D. 9:7

32. ✎ If $x = 2$, what is the value of $\frac{6x}{3x-3}$?

A. 2

B. 3

C. 4

D. 12

33. Calculate $(-5)^1$

34. Find the value of x that makes the following equation true.

$$11 : 12 = 12 : x$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			-2		3

$$y =$$

36. ✎ A number is decreased by 40% and the result is 43.8. What was the original number?

37. ✎ Express $\frac{29}{200}$ as a terminating decimal

38. ✎ Sixty $1 \times 1 \times 1$ cubes are used to make a rectangular prism. How many different rectangular prisms can be made?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

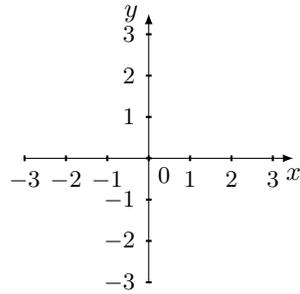|			
1. a. $2 - 7 =$ b. $2 + 3 =$ c. $^-5 + {}^-3 =$ d. $^-3 - {}^-5 =$	2. a. $^-4 \times {}^-7 =$ b. $3 \times {}^-1 =$ c. $14 \div {}^-7 =$ d. $^-24 \div 4 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $2^3 \times 2 =$ b. $7^5 \div 7^2 =$ c. $(6^2)^4 =$	4. a. Simplify 56:21 b. Divide 16 into the ratio 5:11
5. ✎ a. Calculate $-5\left(\frac{4}{5}\right)$ b. Calculate $\frac{7}{3} - 4$	6. a. ✎ Convert $1\frac{1}{10}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{1}{10}$ a recurring or terminating decimal?	7. ✎ Evaluate 38.8×0.16	8. ✎ Decrease 19 by 60%.
9. Simplify the following. a. $-2 - 2 - 2x$ b. $5 \times {}^-3c$	10. Simplify, give answers with positive powers. a. $(a^4)^5 =$ b. $\frac{6b^4}{15b^2} =$	11. a. Expand $2(5x - 6)$ b. Expand $-12(4x + 1)$	12. a. Factorise $10x - 12$ b. Factorise $-7 + 14x$
13. ✎ Substitute $x = 6$ into $7x + 8$ and evaluate.	14. ✎ Substitute $x = 15$ into $\frac{x}{3} - 3$ and evaluate.	15. ✎ Substitute $x = 8$ into $-4x - 9$ and evaluate.	16. ✎ Substitute $x = \frac{10}{11}$ into $-5x - 2$ and evaluate.
17. ✎ Solve the following: $15 = 3 + 2x$	18. ✎ Solve the following: $\frac{x}{7} + 5 = 8$	19. ✎ Solve the following: $6x + 9 = 2x + 21$	20. ✎ Solve the following: $3x - 8 = 4x - 8$

| 21. Consider the linear relationship $$y = -2x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = -2x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

For Q23 table:

x	-1	0	1	2	3
y			3		7

$$y =$$

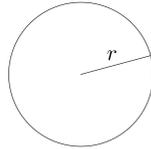**Step 2:** ★ Complete these 6 questions ★ You may use a calculator

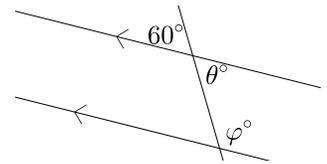**24.** ✎ To the nearest whole number calculate the area of the trapezium.

8cm

9cm

12cm

$A =$
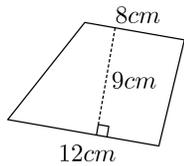
25. ✎ The circle below has a radius of 15.7cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter $=$

b. circumference $=$

c. area $=$

26. Consider the diagram below.

60°

$\theta°$

$\varphi°$

a. State the size of the unknown angles.

$\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	7	1	8
D'	8	5	13
Total	15	6	21

a. P(D)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

C D

8 14 11

4

a. P(D)=

b. P(not D)=

29. ✎ Calculate the following statistics for the below data set

$$2, 3, 3, 0, 1, 7$$

a. median $=$

b. mean to 1 dp. $\approx$

c. mode $=$
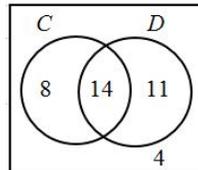
d. range $=$

30. ✎ Jamall and his friends are putting up some tents. Each tent needs 8 pegs. Each peg can only be used for one tent. They have 125 pegs. What is the maximum number of tents they can put up?

A. 4

B. 8

C. 15

D. 16

31. ⊛ ✎ The solution to $-4x + 3 = 5$ is:

A. $x = -2$

B. $x = 2$

C. $x = -\frac{1}{2}$

D. $x = -\frac{1}{2}$

32. At Jai's school there are 320 students, 140 of which are boys. What is the ratio of girls to boys at Jai's school?

A. 16:7

B. 7:16

C. 9:7

D. 7:9

33. ✎ Calculate $-\frac{2}{6} - \frac{1}{6}$

34. Simplify $20 : 22.5$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			9		14

$$y =$$

36. ✎ A number is increased by 20% and the result is 44.4. What was the original number?

37. ✎ The 15th term of an arithmetic sequence is -12 and the 20th term is -22. What are the first three terms of this sequence?

38. ✎ How many 3 digit numbers satisfy the property that the third digit is the sum of the first two digits?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-1 - 5 =$ b. $^-2 + 5 =$ c. $0 - {}^-4 =$ d. $3 + {}^-2 =$	2. a. $4 \times {}^-8 =$ b. $^-1 \times 6 =$ c. $^-24 \div {}^-4 =$ d. $^-64 \div {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $7^2 \times 7^3 =$ b. $3^8 \div 3^6 =$ c. $(9^7)^4 =$	4. a. Simplify 12:6 b. Divide 28 into the ratio 1:6
5. ✎ a. Calculate $-9\left(-\frac{3}{4}\right)$ b. Calculate $-5 + \frac{11}{6}$	6. a. ✎ Convert $2\frac{1}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{1}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.587×35	8. ✎ Decrease 85 by 2%.
9. Simplify the following. a. $6z - 4z - 2z$ b. $-5 \times -5b$	10. Simplify, give answers with positive powers. a. $(a^2)^5 =$ b. $y^4 \times 2y^2 =$	11. a. Expand $4(3x - 5)$ b. Expand $-8(x + 2)$	12. a. Factorise $4x - 4$ b. Factorise $-10x + 8$
13. ✎ Substitute $x = 7$ into $4x + 8$ and evaluate.	14. ✎ Substitute $x = 24$ into $\frac{x}{8} + 5$ and evaluate.	15. ✎ Substitute $x = -3$ into $1 - 5x$ and evaluate.	16. ✎ Substitute $x = \frac{3}{11}$ into $5x + 5$ and evaluate.
17. ✎ Solve the following: $23 = 7 + 8x$	18. ✎ Solve the following: $\frac{x}{3} - 1 = 8$	19. ✎ Solve the following: $4x - 1 = 3x + 2$	20. ✎ Solve the following: $-4x + 4 = x + 1$

21. Consider the linear relationship

$$y = 3x - 3$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$$(0, \quad)$$

$$(\ , 0)$$

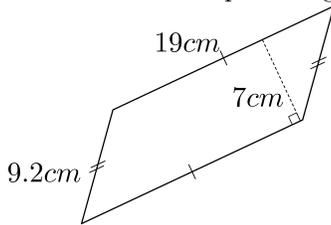22. Sketch the graph of $y = 3x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.
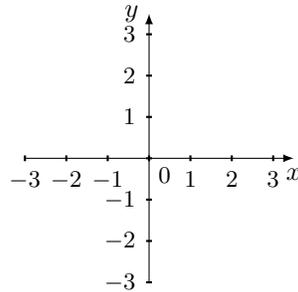
23. The points below satisfy a linear relationship. Complete the table and rule below.

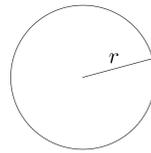| x	-1	0	1	2	3
y		2			-7

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the parallelogram.

19cm

7cm

9.2cm

$A =$

25. ✎ The circle below has a radius of 3.8cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

$\theta°$

$49°$

$\varphi°$

a. State the size of the unknown angles.

$$\theta° = \qquad \varphi° =$$
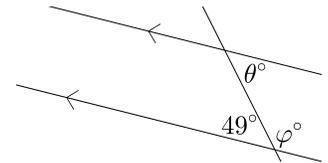
b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	12	2	14
C'	2	13	15
Total	14	15	29

a. P(C)=

b. P(A and C)=

28. Calculate the following probabilities using the Venn diagram below.

A C

4 6 13

9
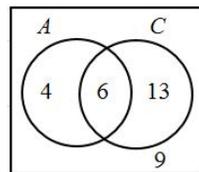
a. P(C)=

b. P(not C)=

29. ✎ Calculate the following statistics for the below data set

$$0, 6, 6, 6, 4, 8, 3, 0$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort
★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ Jamall and his friends are putting up some tents. Each tent needs 8 pegs. Each peg can only be used for one tent. They have 135 pegs. What is the maximum number of tents they can put up?

A. 16

B. 17

C. 127

D. 128

31. ⊕ ✎ Increasing 42 by 20% gives:

A. 8.4

B. 33.6

C. 46.2

D. 50.4

32. ✎ There are 540 girls and boys at a concert.

The ratio of girls to boys at the concert is 2:3. How many girls are at the concert?

A. 216

B. 270

C. 300

D. 324

33. ✎ Calculate $\frac{5}{6} - \frac{11}{12}$

34. Find the value of x that makes the following equation true.

$$6 : 4 = x : 5$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			4		7

$$y =$$

36. ✎ Determine the exact value of the diameter of a circle which has an circumference of 18.7cm.

37. ✎ Express $\frac{160}{9}$ as a recurring decimal

38. ✎ In the year 2008 there were 5 Fridays in February. What year will this occur in next?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $1 - 2 =$ b. $^-5 + 2 =$ c. $5 - ^-2 =$ d. $^-2 + ^-6 =$	2. a. $2 \times ^-7 =$ b. $7 \times ^-4 =$ c. $0 \div ^-8 =$ d. $^-12 \div 2 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $5^5 \times 5^6 =$ b. $8^7 \div 8^2 =$ c. $(2^4)^3 =$	4. a. Simplify 60:72 b. Divide 77 into the ratio 9:2
5. ✎ a. Calculate $-2\left(\frac{1}{4}\right)$ b. Calculate $4 - \frac{9}{7}$	6. a. ✎ Convert $2\frac{3}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{3}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 3.87×0.21	8. ✎ Decrease 89 by 90%.
9. Simplify the following. a. $3c + 4c - 5c$ b. $-4z \times -7$	10. Simplify, give answers with positive powers. a. $(y^5)^3 =$ b. $4y^4 \times 4y =$	11. a. Expand $4(6x - 3)$ b. Expand $-9(4x - 1)$	12. a. Factorise $10x + 4$ b. Factorise $-4x - 12$
13. ✎ Substitute $x = 2$ into $6x - 2$ and evaluate.	14. ✎ Substitute $x = 48$ into $\frac{x}{4} - 6$ and evaluate.	15. ✎ Substitute $x = -4$ into $9x + 7$ and evaluate.	16. ✎ Substitute $x = \frac{1}{11}$ into $-2x - 4$ and evaluate.
17. ✎ Solve the following: $7x - 22 = 27$	18. ✎ Solve the following: $\frac{x - 2}{9} = 3$	19. ✎ Solve the following: $3x - 5 = 2x - 2$	20. ✎ Solve the following: $14 = 3(x - 8)$

| 21. Consider the linear relationship $$y = 3x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\ , 0)$$	22. Sketch the graph of $y = 3x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

(Question 23 table)
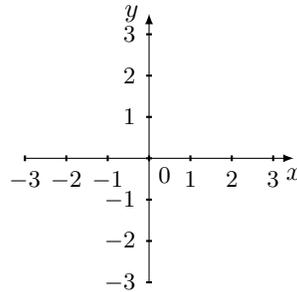
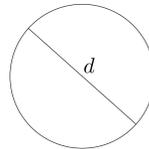| x	-1	0	1	2	3
y		7			28

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator
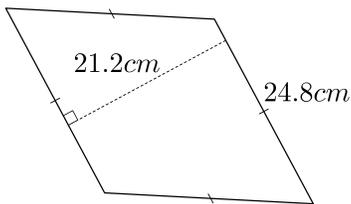
24. ✎ To the nearest whole number calculate the area of the rhombus. $A \approx$	25. ✎ The circle below has a diameter of 27.2cm. Calculate the following, giving answers to 2dp. where appropriate. a. radius = b. circumference = c. area =	26. Consider the diagram below. a. State the size of the unknown angles. $$\theta° = \qquad \varphi° =$$ b. What is the relationship between θ and φ?
27. Calculate the following probabilities using the two-way table below. |	B	B'	Total	 |---|---|---|---| | C	11	9	20	 | C'	3	2	5	 | Total	14	11	25	 a. P(C)= b. P(B and C)=	28. Calculate the following probabilities using the Venn diagram below. a. P(B)= b. P(B or C or both)=	29. ✎ Calculate the following statistics for the below data set $$9, 5, 5, 0, 1$$ a. median = b. mean = c. mode = d. range =
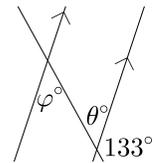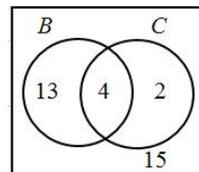
30. ✎ The height of a stack of DVDs is 112.8mm. Each DVD has a thickness of 1.2mm. How many DVDs are in the stack?

31. ✎ The area of the circle below, when rounded to 2 decimal places is:

$d = 2.8cm$

A. 6.16cm^2

B. 8.80cm^2

C. 17.59cm^2

D. 24.63cm^2

32. ⊕ ✎ The graph of $y = 3x - 1$ will be drawn on the Cartesian plane below.
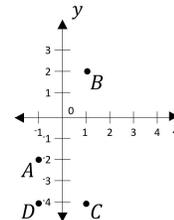
Which two points will the straight line pass through?

A. A and B

B. D and B

C. A and C
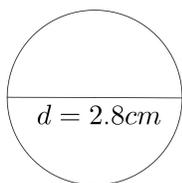
D. D and C

33. ✎ Calculate $-\frac{5}{9} - \frac{6}{11}$

34. Simplify $4.32 : 5.28$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			10		15

$$y =$$

36. ✎ Determine the exact value of the radius of a circle which has an area of 10cm^2.

37. ✎ An arithmetic sequence begins with the numbers 15, 17, 19. What is the 48th term of the sequence?

38. ✎ There are 8 sticks. The first stick is 1cm long, the second is 2cm long and so on up to the longest stick which is 8cm long. How many different triangles can be formed using any 3 of these sticks?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

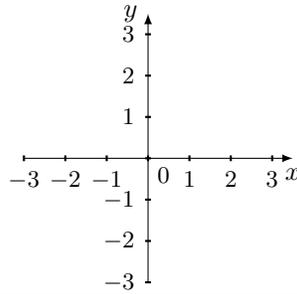|			
1. a. $^-6 + 10 =$ b. $^-6 - 2 =$ c. $^-4 + ^-3 =$ d. $^-3 - ^-1 =$	2. a. $8 \times ^-3 =$ b. $6 \times ^-6 =$ c. $20 \div ^-4 =$ d. $^-35 \div ^-7 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $3^2 \times 3^4 =$ b. $5^4 \div 5^4 =$ c. $(5^2)^2 =$	4. a. Simplify 6:9 b. Divide 72 into the ratio 7:11
5. ✎ a. Calculate $-5\left(\frac{1}{3}\right)$ b. Calculate $-\frac{5}{2} + 2$	6. a. ✎ Convert $2\frac{2}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{2}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.38×55.6	8. ✎ Decrease 79 by 7%.
9. Simplify the following. a. $-2a - 7a - 4a$ b. $-7y \times 6y$	10. Simplify, give answers with positive powers. a. $x^3 \times x =$ b. $5y^3 \times 2y^4 =$	11. a. Expand $4(4x + 5)$ b. Expand $-5(5x + 2)$	12. a. Factorise $8x + 12$ b. Factorise $-12 + 18x$
13. ✎ Substitute $x = 6$ into $6x + 8$ and evaluate.	14. ✎ Substitute $x = 7$ into $5(x + 1)$ and evaluate.	15. ✎ Substitute $x = -8$ into $9x - 8$ and evaluate.	16. ✎ Substitute $x = \frac{1}{6}$ into $-5x + 4$ and evaluate.
17. ✎ Solve the following: $21 = 3x + 9$	18. ✎ Solve the following: $5(x + 2) = 35$	19. ✎ Solve the following: $2x - 1 = 5x - 19$	20. ✎ Solve the following: $x + 9 = 4x - 10$

| 21. Consider the linear relationship $$y = -2x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$	22. Sketch the graph of $y = -2x + 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Table for Question 23:

x	-1	0	1	2	3
y			12		24

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the volume of the triangular prism.

15.3cm, 11.9cm, 10.9cm, 15.5cm, 11.3cm

$$V \approx$$
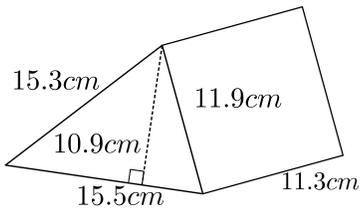
25. ✎ The circle below has a radius of 3.7cm. Calculate the following, giving answers to 2dp. where appropriate.
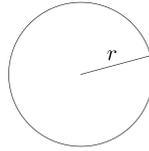
a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

$129°$, $\varphi°$, $\theta°$

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

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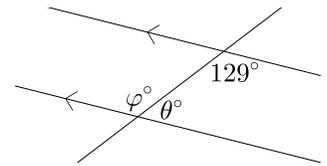
27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
D	9	14	23
D'	2	12	14
Total	11	26	37

a. P(D)=

b. P(not B)=

28. Calculate the following probabilities using the Venn diagram below.
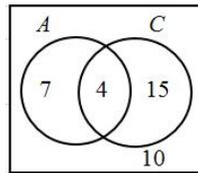
a. P(C)=

b. P(A and C)=

29. ✎ Calculate the following statistics for the below data set

$$9, 8, 8, 3, 4, 6$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort
★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ Simon bought 2 muffins and 5 bread rolls at the bakery. The muffins cost \$2.80 each and the rolls cost 80c each. How much did Simon's purchase cost?	31. ⊛ Which calculation has the same value as 16×2 **A.** $10 + 6 + 2$ **B.** $10 \times 2 + 6$ **C.** $10 \times 6 + 4$ **D.** $10 \times 2 + 12$	32. A skateboard originally cost \$280 and then went on sale for \$224. What percentage discount is this? **A.** 80% **B.** 56% **C.** 25% **D.** 20%
33. ✎ Calculate $\frac{7}{8} - \frac{2}{4}$	34. Simplify $1\frac{2}{5} : 3\frac{9}{10}$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. $y =$
36. ✎ A number is decreased by 40% and the result is 7.8. What was the original number?	37. ✎ Express $\frac{231}{99}$ as a recurring decimal	38. ✎ Gina has 6 sticks, all of different lengths, which she uses to make an equilateral triangle with two sticks along each side. Five of her six sticks measure 45, 49, 53, 57 and 61 centimetres. How many different lengths are possible for the 6th stick?

Table for question 35:

x	-1	0	1	2	3
y		-1			7

12
11
10
9
8
7
6
5
4
3
2
1
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12

MULTIPLICATION GRID

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

PRIME NUMBERS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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Key Skills Training - L3+

name: _____

Welcome to the Key Skills Training Program for Schools. These sheets are designed to give you multiple opportunities to learn and revise key mathematical skills. Completing these sheets will help you become equipped with the skills you need to be a successful user of mathematics in school and also every day life. The following points will help you get the most out of the program. Enjoy!

- When you see the ✎ symbol include some working to support your answer. This could involve a calculation, annotating a diagram or an explanation of your thought process.

- All fractional answers must be given in simplified form.

- You may be able to complete very few questions or almost all of them, it doesn't matter. As long as you give your best effort and try to improve each time you are maximising your success!

- If you feel that some or all of these questions aren't suitable for you, have a chat with your teacher.

Time to get started on Sheet 1. Turn the page and complete the questions on pages 2, 3 and 4.

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^{-}2 + 3 =$ b. $3 - 6 =$ c. $^{-}1 + ^{-}2 =$ d. $^{-}4 - ^{-}2 =$	2. a. $1 \times ^{-}8 =$ b. $^{-}7 \times 3 =$ c. $36 \div ^{-}6 =$ d. $25 \div ^{-}5 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(5^8)^3 =$ b. $\frac{9^7}{9^7} =$ c. $8^7 \times 8^4 =$	4. a. Simplify 6:9 b. Divide 4 into the ratio 1:3
5. ✎ a. Calculate $-3\left(-\frac{1}{2}\right)$ b. Calculate $-\frac{8}{5} - 3$	6. a. ✎ Convert $\frac{1}{6}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{1}{6}$ a recurring or terminating decimal?	7. ✎ Evaluate 1.67×44	8. ✎ Decrease 51 by 4%.
9. Simplify the following. a. $-4 + 4c - 6$ b. $-4 \times -2a$	10. Simplify, give answers with positive powers. a. $a^2 \times a^5 =$ b. $\frac{15b^7}{9b^5} =$	11. a. Expand $3(5x + 6)$ b. Expand $-12(4x + 4)$	12. a. Factorise $4x + 12$ b. Factorise $-12 + 36x$
13. ✎ Substitute $x = 5$ into $5x - 8$ and evaluate.	14. ✎ Substitute $x = 7$ into $7(x - 1)$ and evaluate.	15. ✎ Substitute $x = 7$ into $-3x - 10$ and evaluate.	16. ✎ Substitute $x = \frac{3}{7}$ into $-2x - 3$ and evaluate.
17. ✎ Solve the following: $60 = 4 + 8x$	18. ✎ Solve the following: $\frac{x}{2} - 2 = 2$	19. ✎ Solve the following: $3x - 5 = 2x$	20. ✎ Solve the following: $2x + 2 = x + 7$

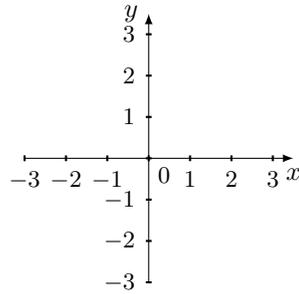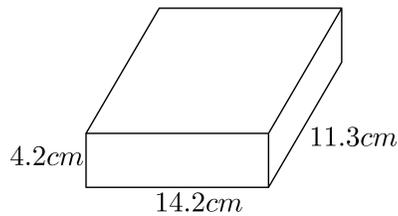| 21. Consider the linear relationship

$$y = -3x - 3$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\quad , 0)$ | 22. Sketch the graph of $y = -3x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.

 | 23. The points below satisfy a linear relationship. Complete the table and rule below.

| x | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|
| y | | -4 | | 4 | |

$y =$ |

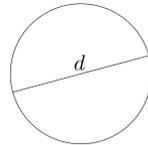**Step 2: ★ Complete these 6 questions ★ You may use a calculator**

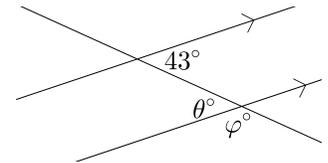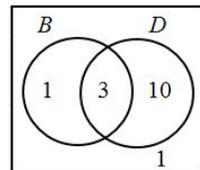| 24. ✎ To the nearest whole number calculate the volume of the rectangular prism.

4.2cm
11.3cm
14.2cm

$V \approx$ | 25. ✎ The circle below has a diameter of 18.4cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =

c. area = | 26. Consider the diagram below.

43°
$\theta°$ $\varphi°$

a. State the size of the unknown angles.
$\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ? |
27. Calculate the following probabilities using the two-way table below. |	B	B'	Total
D	8	6	14
D'	4	9	13
Total	12	15	27 | a. P(B)= b. P(not B)=	28. Calculate the following probabilities using the Venn diagram below. B D 1 3 10 1 a. P(B)= b. P(B and D)=	29. ✎ Calculate the following statistics for the below data set $$8, 5, 4, 6, 5$$ a. median = b. mean to 1 dp. = c. mode = d. range =

3

30. On Tuesday it was -6°celcius and on Wednesday it was -2°celcius. Which day was colder and by how much?	31. ✎ The mean of the data set below, correct to one decimal place is: $$2, 8, 5, 4, 0$$ **A.** 3.8 **B.** 4 **C.** 4.75 **D.** 5	32. An electrician calculates the price of a job using a service fee and an amount **per hour**. This table shows some of the job prices. <table><tr><td>Hours</td><td>3</td><td>5</td><td>7</td><td>8</td></tr><tr><td>Job Price</td><td>262</td><td>390</td><td>518</td><td>582</td></tr></table> How are the job prices calculated? **A.** \$122 service fee + \$128 per hour **B.** \$134 service fee + \$128 per hour **C.** \$70 service fee + \$64 per hour **D.** \$134 service fee + \$64 per hour
33. Calculate $(-3)^4$	34. Find the value of x that makes the following equation true. $$8 : 3 = 5 : x$$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. | x	-1	0	1	2	3
---	---	---	---	---	---
y		-10			-2	 $$y =$$
36. ✎ A number is decreased by 50% and the result is 9.5. What was the original number?	37. ✎ An arithmetic sequence begins with the numbers 23, 16, 9. What is the 57th term of the sequence?	38. ✎ How many positive integers which when squared is a factor of 4000?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $3 - 6 =$ b. $^-5 + 2 =$ c. $^-4 + {}^-2 =$ d. $^-4 - {}^-5 =$	2. a. $^-4 \times {}^-8 =$ b. $^-1 \times 2 =$ c. $6 \div 3 =$ d. $^-49 \div {}^-7 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $6^5 \times 6^7 =$ b. $(9^3)^0 =$ c. $9^2 \div 9 =$	4. a. Simplify 63:90 b. Divide 15 into the ratio 4:11
5. ✎ a. Calculate $-9\left(\frac{1}{5}\right)$ b. Calculate $\frac{8}{7} - 2$	6. a. ✎ Convert $\frac{1}{3}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{1}{3}$ a recurring or terminating decimal?	7. ✎ Evaluate 2.56×11	8. ✎ Increase 33 by 30%.
9. Simplify the following. a. $-6b - 6 + 6$ b. $3 \times -7a$	10. Simplify, give answers with positive powers. a. $(y^5)^3 =$ b. $(s^3)^4 =$	11. a. Expand $4(6x - 4)$ b. Expand $-(4x + 2)$	12. a. Factorise $12x - 16$ b. Factorise $-9x + 9$
13. ✎ Substitute $x = 3$ into $3x - 5$ and evaluate.	14. ✎ Substitute $x = 7$ into $7(x - 2)$ and evaluate.	15. ✎ Substitute $x = 8$ into $-6x - 10$ and evaluate.	16. ✎ Substitute $x = \frac{2}{5}$ into $5 - 5x$ and evaluate.
17. ✎ Solve the following: $1 = 3x - 14$	18. ✎ Solve the following: $\dfrac{x - 7}{7} = 3$	19. ✎ Solve the following: $x + 10 = 2x + 5$	20. ✎ Solve the following: $4x + 1 = -4x + 10$

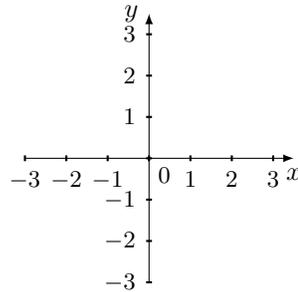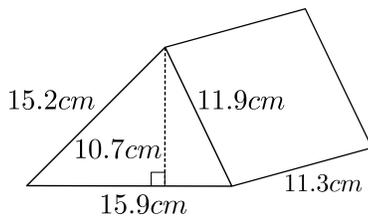| 21. Consider the linear relationship $$y = 2x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0,\ \ )$ $(\ \ ,\ 0)$	22. Sketch the graph of $y = 2x + 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Question 23 table:

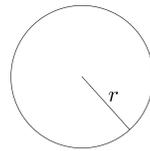| x	-1	0	1	2	3
y		4		-4	

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the volume of the triangular prism.
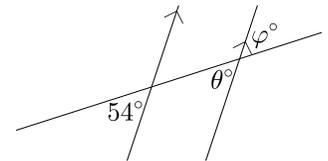

15.2cm 11.9cm 10.7cm 11.3cm 15.9cm

$V \approx$

25. ✎ The circle below has a radius of 24.7cm. Calculate the following, giving answers to 2dp. where appropriate.

a. diameter $=$

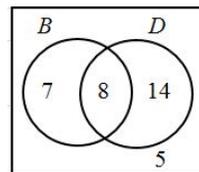b. circumference $=$

c. area $=$

26. Consider the diagram below.

$\varphi°$ $\theta°$ $54°$

a. State the size of the unknown angles.

$\theta° =$ $\qquad$ $\varphi° =$

b. What is the relationship between θ and φ?

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27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
D	14	3	17
D'	6	8	14
Total	20	11	31

a. P(D)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

B D 7   8   14   5

a. P(D)=

b. P(B and D)=

29. ✎ Calculate the following statistics for the below data set

$$6, 7, 2, 0, 8$$

a. median $=$

b. mean to 1 dp. $=$

c. mode $=$

d. range $=$

Step 3: ★ Complete the challenge questions below with your best effort ★ You may use a calculator on questions 30-32 unless otherwise stated		
30. Tasmanian Atlantic Salmon costs $29.89 per kilo. Rounding to the nearest cent, how much does 0.4kg cost?	31. ⊞ ✎ Evaluating 0.2×3.05 gives **A.** 610 **B.** 6.1 **C.** 0.61 **D.** 0.061	32. ⊞ Which expression is equivalent to $5 - 6t$ **A.** $6 - 5t$ **B.** $6t - 5$ **C.** $-5 + 6t$ **D.** $-5t + 6$
33. ✎ Calculate $-3.7 - 7.5$	34. Simplify $0.4 : 0.2$	35. ✎ Rearrange $g = \frac{h}{e} - f$ to make h the subject.
36. ✎ A number is decreased by 20% and the result is 55.2. What was the original number?	37. ✎ Express $\frac{129}{40}$ as a terminating decimal	38. ✎ Kylie had an unusual experience while shopping; she found that every time she bought something, it took exactly 40% of the money that she had in her purse. She bought 3 items, and finished her shopping with $108. How much money did she have in her purse to begin with?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $1 - 2 =$ b. $^-5 + 10 =$ c. $^-1 + {}^-1 =$ d. $^-5 - {}^-1 =$	2. a. $^-2 \times 2 =$ b. $5 \times {}^-2 =$ c. $0 \div {}^-3 =$ d. $^-25 \div {}^-5 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(6^5)^6 =$ b. $\frac{7^6}{7^6} =$ c. $8^3 \times 8^7 =$	4. a. Simplify 25:5 b. Divide 36 into the ratio 7:5
5. ✎ a. Calculate $-3\left(\frac{3}{10}\right)$ b. Calculate $-\frac{11}{10} + 3$	6. a. ✎ Convert $1\frac{2}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{2}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.18×5.55	8. ✎ Increase 39 by 90%.
9. Simplify the following. a. $4 - 3z - 4$ b. $-3 \times 4b$	10. Simplify, give answers with positive powers. a. $b^4 \times b^5 =$ b. $\frac{4b^8}{2b^7} =$	11. a. Expand $4(2x - 2)$ b. Expand $-7(3x - 4)$	12. a. Factorise $9x - 12$ b. Factorise $-28x - 21$
13. ✎ Substitute $x = 5$ into $3x - 5$ and evaluate.	14. ✎ Substitute $x = 36$ into $\frac{x}{4} - 4$ and evaluate.	15. ✎ Substitute $x = -7$ into $-3x - 9$ and evaluate.	16. ✎ Substitute $x = \frac{2}{3}$ into $5x + 2$ and evaluate.
17. ✎ Solve the following: $5x - 19 = 6$	18. ✎ Solve the following: $\frac{x}{7} - 4 = 2$	19. ✎ Solve the following: $5x + 2 = 2x + 14$	20. ✎ Solve the following: $18 = 4(x - 5)$

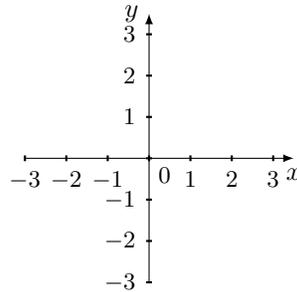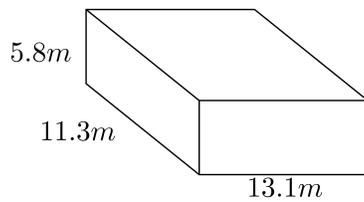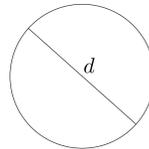| 21. Consider the linear relationship

$$y = 2x - 3$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\quad , 0)$ | 22. Sketch the graph of $y = 2x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.

 | 23. The points below satisfy a linear relationship. Complete the table and rule below.

| x | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|
| y | | -3 | | | -15 |

$y =$ |

Step 2: ★ Complete these 6 questions ★ You may use a calculator

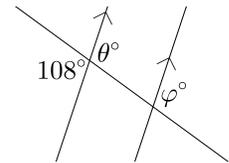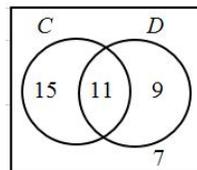| 24. ✎ To the nearest whole number calculate the volume of the rectangular prism.

5.8m
11.3m
13.1m

$V \approx$ | 25. ✎ The circle below has a diameter of 18.2cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =

c. area = | 26. Consider the diagram below.

$108°$ $\theta°$ $\varphi°$

a. State the size of the unknown angles.
$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ? |

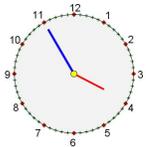| 27. Calculate the following probabilities using the two-way table below. |	C	C'	Total
D	1	8	9
D'	2	7	9
Total	3	15	18 | a. P(D)= b. P(C and D)=	28. Calculate the following probabilities using the Venn diagram below. C D 15 (11) 9 7 a. P(C)= b. P(not D)=	29. ✎ Calculate the following statistics for the below data set $$9, 4, 7, 1, 8, 4$$ a. median = b. mean to 1 dp. = c. mode = d. range =

30. What time is shown on the clock?

A. 3:55

B. 4:05

C. 4:55

D. 11:20

31. ✎ The circumference of the circle below, when rounded to 2 decimal places is:

$d = 2.8cm$
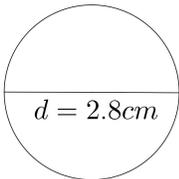
A. 6.16cm

B. 8.80cm

C. 17.59cm

D. 24.63cm

32. ⊞ ✎ The value of $6m^2$ when $m = -3$ is:

A. -54

B. -36

C. 54

D. 324

33. ✎ Calculate $-1.4 - 5.62$

34. Simplify $0.66 : 0.48$

35. ✎ Rearrange $g = eh + f$ to make e the subject.

36. ✎ Determine the exact value of the diameter of a circle which has an area of 19cm^2.

37. ✎ Express $5.\overline{5}$ as an improper fraction

38. ✎ In how many ways can 63 be expressed as the sum of at least two positive integers, all of which are consecutive?

12

	Key Skills Training Level 3+	Name:
mathsquad	Sheet 4	Due date:

1. a. $^-5 - 1 =$	2. a. $5 \times ^-7 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 21:15
b. $^-6 + 1 =$	b. $^-8 \times ^-6 =$	a. $7^3 \times 7^4 =$	b. Divide 110 into the ratio 3:7
c. $^-3 - ^-3 =$	c. $1 \div ^-1 =$	b. $7^6 \div 7^5 =$	
d. $^-3 + ^-2 =$	d. $^-10 \div 2 =$	c. $(8^6)^0 =$	

5. ✎ a. Calculate $-6\left(\frac{1}{9}\right)$ b. Calculate $\frac{9}{5} - 2$	6. a. ✎ Convert $\frac{3}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{3}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 24×37.6	8. ✎ Decrease 80 by 7%.

9. Simplify the following. a. $-6b - 5 + 3$ b. $2 \times 5x$	10. Simplify, give answers with positive powers. a. $y^3 \times y =$ b. $4y^4 \times 5y^2 =$	11. a. Expand $4(6x + 4)$ b. Expand $-(2x + 3)$	12. a. Factorise $6x + 4$ b. Factorise $-10 + 10x$

13. ✎ Substitute $x = 6$ into $9x + 6$ and evaluate.	14. ✎ Substitute $x = 21$ into $\frac{x-7}{7}$ and evaluate.	15. ✎ Substitute $x = 6$ into $-3x + 7$ and evaluate.	16. ✎ Substitute $x = \frac{1}{3}$ into $4 + 3x$ and evaluate.

17. ✎ Solve the following: $29 = 5x + 4$	18. ✎ Solve the following: $5 = \frac{x + 19}{9}$	19. ✎ Solve the following: $4x + 9 = 2x + 15$	20. ✎ Solve the following: $-5x - 5 = -4x - 3$

| 21. Consider the linear relationship $$y = -3x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$ | 22. Sketch the graph of $y = -3x + 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23.
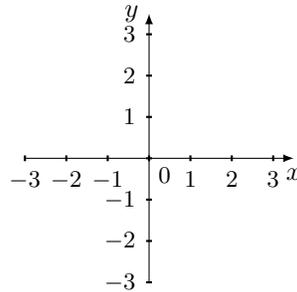
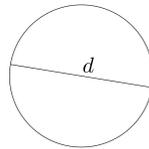| x	-1	0	1	2	3
y	-9			12	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the area of the triangle.

21.9mm
15.6mm 21.6mm
24.5mm

$A =$
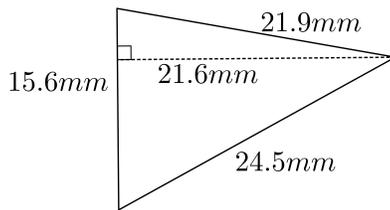
25. ✎ The circle below has a diameter of 21.8cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

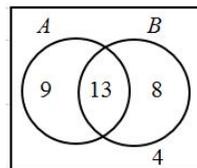b. circumference =

c. area =

26. Consider the diagram below.

a. State the size of the unknown angles.
   $\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
D	12	5	17
D'	6	14	20
Total	18	19	37

a. P(D)=

b. P(A and D)=

28. Calculate the following probabilities using the Venn diagram below.

A B
9 13 8
4

a. P(A)=

b. P(A and B)=

29. ✎ Calculate the following statistics for the below data set

$$7, 3, 2, 5, 3, 3$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort

★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ Photo prints at Harvey Norman cost 15 cents. How much does it cost to buy 47 prints?	31. ⊕ Which one of the following expressions is equivalent to $-3(2x-1)$? **A.** $-6x-4$ **B.** $-6x-3$ **C.** $-6x+3$ **D.** $-3x$	32. ✎ The diameter of a circular table top is 1.8 metres. What is its circumference to the nearest metre? **A.** 11m **B.** 10m **C.** 6m **D.** 5m
33. ✎ Calculate $\frac{2}{11} - \frac{9}{10}$	34. Simplify $1.6 : 7.2$	35. ✎ The points below satisfy a linear relationship. Complete the rule below. <table><tr><td>x</td><td>-1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>y</td><td></td><td></td><td>7</td><td></td><td>2</td></tr></table> $y =$
36. ✎ Determine the exact value of the diameter of a circle which has an area of 34cm^2.	37. ✎ The 14th term of an arithmetic sequence is -40 and the 19th term is -65. What are the first three terms of this sequence?	38. ✎ If is is 9am now, what time will it be 2000 hours from now?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

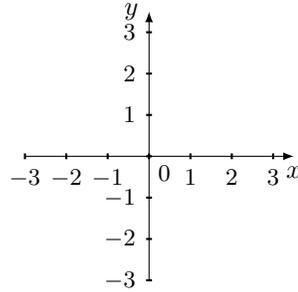|			
1. a. $-2 + 1 =$ b. $-6 - 4 =$ c. $6 - {-3} =$ d. $-4 + {-1} =$	2. a. $8 \times {-3} =$ b. $-3 \times 5 =$ c. $-30 \div 6 =$ d. $-5 \div 5 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $(3^6)^3 =$ b. $\frac{6^8}{6^6} =$ c. $8^5 \times 8^2 =$	4. a. Simplify 48:42 b. Divide 28 into the ratio 3:1
5. ✎ a. Calculate $-2\left(\frac{2}{3}\right)$ b. Calculate $\frac{7}{3} - 2$	6. a. ✎ Convert $2\frac{4}{5}$ to a decimal. Round to 4 decimal places where necessary. b. Is $2\frac{4}{5}$ a recurring or terminating decimal?	7. ✎ Evaluate 3.7×17.6	8. ✎ Increase 77 by 30%.
9. Simplify the following. a. $6 + 6 + 2b$ b. $-a \times 1a$	10. Simplify, give answers with positive powers. a. $\frac{a^8}{a^3} =$ b. $\frac{9b^6}{12b} =$	11. a. Expand $3(2x + 2)$ b. Expand $-6(x + 1)$	12. a. Factorise $8x - 4$ b. Factorise $-6 + 10x$
13. ✎ Substitute $x = 3$ into $8x - 5$ and evaluate.	14. ✎ Substitute $x = 96$ into $\frac{x}{8} - 8$ and evaluate.	15. ✎ Substitute $x = -6$ into $-2x - 6$ and evaluate.	16. ✎ Substitute $x = \frac{1}{2}$ into $-5x - 3$ and evaluate.
17. ✎ Solve the following: $8x + 5 = 45$	18. ✎ Solve the following: $3 = \frac{x}{8} + 1$	19. ✎ Solve the following: $5x + 10 = 4x + 13$	20. ✎ Solve the following: $5(x - 9) = 17$

| 21. Consider the linear relationship $$y = 2x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = 2x + 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Question 22 graph with axes labelled y from -3 to 3 and x from -3 to 3.

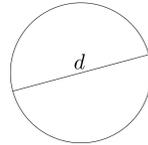| x	-1	0	1	2	3
y			-3		1

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the trapezium.
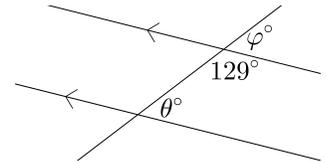
7cm, 10cm, 16cm

$A =$
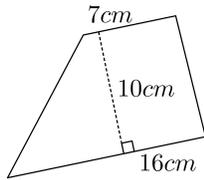
25. ✎ The circle below has a diameter of 29.2cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =
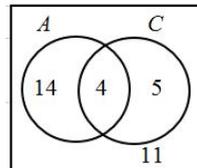
c. area =

26. Consider the diagram below.

$\varphi°$, $129°$, $\theta°$

a. State the size of the unknown angles.
$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	1	3	4
C'	15	11	26
Total	16	14	30

a. P(C)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

A C 14 4 5 11

a. P(C)=

b. P(not A)=

29. ✎ Calculate the following statistics for the below data set

$$9, 0, 4, 7, 0, 1, 1, 1$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. A 600g tub of m&ms costs $8. To the nearest cent, what is the cost per 100g?	31. ⊕ Evaluating $-4 + \frac{7}{3}$ gives: **A.** $\frac{19}{3}$ **B.** $\frac{5}{3}$ **C.** $-\frac{19}{3}$ **D.** $-\frac{5}{3}$	32. ✎ The cost in dollars to print n books is $400 + 10n$. How many books are printed for a cost of 14000?
33. ✎ Calculate $-\frac{1}{8} + \frac{1}{5}$	34. Find the value of x that makes the following equation true. $$3 : 8 = 2 : x$$	35. ✎ Rearrange $\frac{s}{p} - q = r$ to make p the subject.
36. ✎ A number is decreased by 30% and the result is 66.5. What was the original number?	37. ✎ The 1st term of an arithmetic sequence is 11 and the 2nd term is 18. What is the term number of 571?	38. ✎ A fruit shop packs apples into small bags of 6 and large bags of 20. 604 apples were packed into 40 bags. How many large bags were packed?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-2 + 1 =$ b. $^-3 - 6 =$ c. $^-2 - {}^-3 =$ d. $^-2 + {}^-3 =$	2. a. $1 \times {}^-4 =$ b. $1 \times {}^-8 =$ c. $^-28 \div 7 =$ d. $0 \div {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $3^2 \times 3^6 =$ b. $(4^5)^7 =$ c. $2^8 \div 2^4 =$	4. a. Simplify 5:20 b. Divide 49 into the ratio 1:6
5. ✎ a. Calculate $9\left(-\frac{1}{4}\right)$ b. Calculate $4 - \frac{8}{5}$	6. a. ✎ Convert $1\frac{7}{10}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{7}{10}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.567×4.3	8. ✎ Decrease 66 by 90%.
9. Simplify the following. a. $-1 - 3 + a$ b. $-2c \times -4$	10. Simplify, give answers with positive powers. a. $(b^2)^5 =$ b. $y^3 \times 2y^3 =$	11. a. Expand $3(x - 5)$ b. Expand $-9(5x + 2)$	12. a. Factorise $16x - 24$ b. Factorise $-6 + 18x$
13. ✎ Substitute $x = 5$ into $6x + 6$ and evaluate.	14. ✎ Substitute $x = 6$ into $2(x - 1)$ and evaluate.	15. ✎ Substitute $x = 2$ into $-6x + 6$ and evaluate.	16. ✎ Substitute $x = \frac{2}{3}$ into $-4x - 4$ and evaluate.
17. ✎ Solve the following: $8x - 19 = 5$	18. ✎ Solve the following: $2(x - 3) = 4$	19. ✎ Solve the following: $4x + 5 = x + 11$	20. ✎ Solve the following: $5(x + 7) = 21$

21. Consider the linear relationship

$$y = 5x - 3$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$$(0, \quad)$$

$$(\quad , 0)$$

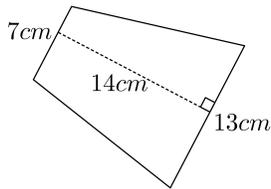22. Sketch the graph of $y = 5x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.
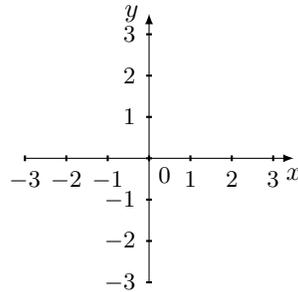
23. The points below satisfy a linear relationship. Complete the table and rule below.

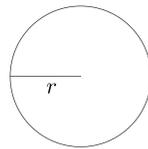| x	-1	0	1	2	3
y		-5			-23

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the area of the trapezium.
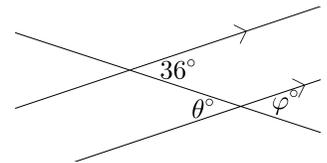
7cm

14cm

13cm

$A =$

25. ✎ The circle below has a radius of 18.2cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

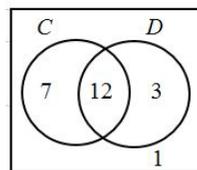b. circumference =

c. area =

26. Consider the diagram below.

36°

$\theta°$

$\varphi°$

a. State the size of the unknown angles.

$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	4	4	8
D'	13	6	19
Total	17	10	27

a. P(C)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

C D

7 12 3

1

a. P(D)=

b. P(C and D)=

29. ✎ Calculate the following statistics for the below data set

$$5, 2, 5, 0, 2, 3$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

23

30. ✎ Oscar took a bus from Melbourne to Sydney. His bus left at 8:50am and arrived at 8:15pm on the same day. How long did Oscar's bus trip take?

31. ⊞ ✎ Substituting $x = 3$ into $-4x + 2$ and evaluating gives:

A. -41

B. -14

C. -10

D. 14

32. ⊞ Below is a set of 8 scores.

$$3, 5, 5, 8, 8, 9, 9, 40$$

What will change if the score of 40 is removed from the list?

A. mean only

B. mean and median

C. mean and mode

D. mean and range

33. ✎ Calculate $-8.69 + 9.34$

34. Find the value of x that makes the following equation true.

$$12 : 8 = 8 : x$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y		-8			-12

$$y =$$

36. ✎ A number is decreased by 70% and the result is 11.1. What was the original number?

37. ✎ Express $4.\overline{3}$ as an improper fraction

38. ✎ Express 80 as a sum of consecutive positive integers

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-6 + 10 =$	2. a. $3 \times {}^-4 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 16:14
b. $^-6 - 10 =$	b. $2 \times {}^-7 =$	a. $2^4 \times 2^6 =$	b. Divide 35 into the ratio 2:5
c. $^-5 + {}^-4 =$	c. $24 \div {}^-4 =$	b. $(5^3)^7 =$	
d. $^-4 - {}^-6 =$	d. $^-21 \div 7 =$	c. $2^7 \div 2^4 =$	

5. ✎ a. Calculate $-6\left(\frac{2}{9}\right)$	6. a. ✎ Convert $\frac{3}{8}$ to a decimal. Round to 4 decimal places where necessary.	7. ✎ Evaluate 0.46×47.7	8. ✎ Increase 70 by 80%.
b. Calculate $-\frac{5}{2} + 4$	b. Is $\frac{3}{8}$ a recurring or terminating decimal?		

9. Simplify the following. a. $5x - 6x - 4$	10. Simplify, give answers with positive powers. a. $\frac{b^3}{b^2} =$	11. a. Expand $2(x - 6)$	12. a. Factorise $4x + 12$
b. $-5 \times -3z$	b. $\frac{4q^3}{12q} =$	b. Expand $-7(x + 5)$	b. Factorise $-4x - 2$

13. ✎ Substitute $x = 5$ into $2x - 8$ and evaluate.	14. ✎ Substitute $x = 5$ into $4(x - 4)$ and evaluate.	15. ✎ Substitute $x = -6$ into $1 - 6x$ and evaluate.	16. ✎ Substitute $x = \frac{1}{11}$ into $3x - 2$ and evaluate.

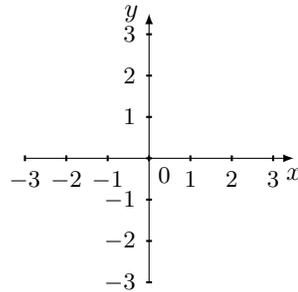| 17. ✎ Solve the following: $11 = 4x + 3$	18. ✎ Solve the following: $9(x + 4) = 72$	19. ✎ Solve the following: $2x - 6 = 5x - 24$	20. ✎ Solve the following: $-2x - 4 = -5x - 3$

| 21. Consider the linear relationship $$y = -2x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$ | 22. Sketch the graph of $y = -2x - 3$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23.
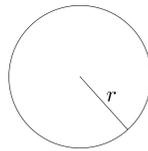| x	-1	0	1	2	3
y			4		14

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the area of the rhombus.

19.2cm   23.3cm

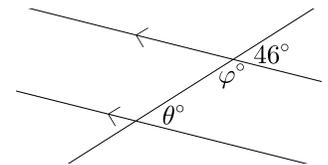$A \approx$
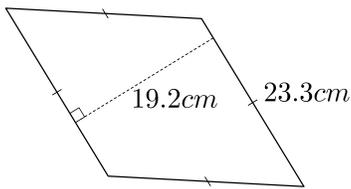
25. ✎ The circle below has a radius of 24.6cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

46°

$\varphi°$

$\theta°$

a. State the size of the unknown angles.
$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	13	11	24
C'	2	1	3
Total	15	12	27

a. P(C)=

b. P(B and C)=

28. Calculate the following probabilities using the Venn diagram below.

B C

7   14   15

15

a. P(C)=

b. P(B and C)=

29. ✎ Calculate the following statistics for the below data set

$$2, 5, 2, 6, 5, 3$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. ✎ QANTAS bought 4 new planes for a total cost of $482.2 million. If each plane cost the same amount, how much did each plane cost?	31. ⊞ Dividing 42 into the ratio 1:6 gives: **A.** 7 and 35 **B.** 6 and 36 **C.** 6 and 42 **D.** 7 and 42	32. ✎ After 17 games of basketball, Josie's average (mean) number of points scored was 18. After 20 games her average had increased to 21 points. What was her average number of points per game for the last 4 games?
33. ✎ Calculate $42.8 - 88.5$	34. Find the value of x that makes the following equation true. $$5 : 4 = 4 : x$$	35. ✎ Rearrange $ax + b = c$ to make x the subject.
36. ✎ A number is decreased by 40% and the result is 34.8. What was the original number?	37. ✎ An arithmetic sequence begins with the numbers 16, 23, 30. What is the 53rd term of the sequence?	38. ✎ Mark and James start counting at the same time and at the same speed. Mark counts forward by twos from 108, i.e. 108, 110, 112,... while James counts backwards by fives starting at 958, i.e. 958, 953, 948... What are the two numbers that they say at the same time which are closest together?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-4 - 2 =$ b. $3 + 6 =$ c. $^-2 + {}^-1 =$ d. $^-1 - {}^-1 =$	2. a. $6 \times {}^-3 =$ b. $1 \times {}^-1 =$ c. $9 \div {}^-3 =$ d. $25 \div {}^-5 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $\frac{3^6}{3} =$ b. $(8^4)^2 =$ c. $6^5 \times 6 =$	4. a. Simplify 77:110 b. Divide 3 into the ratio 2:1
5. ✎ a. Calculate $-5\left(\frac{1}{2}\right)$ b. Calculate $\frac{3}{2} - 2$	6. a. ✎ Convert $\frac{6}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{6}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 11×0.166	8. ✎ Increase 70 by 3%.
9. Simplify the following. a. $4 - 3x - 2x$ b. $-7 \times -5a$	10. Simplify, give answers with positive powers. a. $(x^3)^2 =$ b. $(3s^3)^4 =$	11. a. Expand $2(4x - 2)$ b. Expand $-11(5x + 2)$	12. a. Factorise $12x + 12$ b. Factorise $-12x + 24$
13. ✎ Substitute $x = 5$ into $8x - 34$ and evaluate.	14. ✎ Substitute $x = 6$ into $8(x + 1)$ and evaluate.	15. ✎ Substitute $x = 9$ into $-3x - 4$ and evaluate.	16. ✎ Substitute $x = \frac{3}{4}$ into $-3x - 5$ and evaluate.
17. ✎ Solve the following: $4 = 8x - 20$	18. ✎ Solve the following: $81 = 9(x + 2)$	19. ✎ Solve the following: $3x - 2 = x + 10$	20. ✎ Solve the following: $4(x + 8) = 23$

| 21. Consider the linear relationship $$y = -5x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$ | 22. Sketch the graph of $y = -5x - 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

x	-1	0	1	2	3
y			10		18

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the perimeter of the triangle.

$P \approx$

25. ✎ The circle below has a diameter of 17.6cm. Calculate the following, giving answers to 2dp. where appropriate.

a. radius =

b. circumference =

c. area =

26. Consider the diagram below.

a. State the size of the unknown angles.
  $\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	12	15	27
D'	8	14	22
Total	20	29	49

a. P(D)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

a. P(B)=

b. P(A or B or both)=

29. ✎ Calculate the following statistics for the below data set

$$9, 2, 2, 7, 7, 9, 3, 1$$

a. median =

b. mean =

c. mode =

d. range =

---

30. ✎ Cooked prawns cost $18.99 per kilo. Rounding to the nearest cent, how much does 1.2kg cost?

31. ⊞ The expression $4^{12} \div 4^2$ simplifies to:

A. 4^{24}

B. 4^{14}

C. 4^{10}

D. 4^6

32. ⊞ ✎ Which of the following equations is true?

A. $3^4 = 4^3$

B. $3^4 = 6^2$

C. $2^6 = 6^2$

D. $2^6 = 4^3$

---

33. ✎ Calculate $-72.38 + 86.8$

34. Simplify $0.44 : 0.4$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y	-9		-10		

$$y =$$

---

36. ✎ A number is increased by 20% and the result is 63.6. What was the original number?

37. ✎ An arithmetic sequence begins with the numbers 4, 10, 16. What is the sum of the first 41 terms?

38. ✎ The value of 40! Is the product of all the whole numbers from 1 to 40 inclusive, i.e. $40! = 1 \times 2 \times \ldots \times 39 \times 40$. In the prime factorisation of 40!, what will the power of 2 be?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $-6 + 7 =$	2. a. $4 \times {}^-4 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 56:32
b. $-1 - 2 =$	b. $1 \times {}^-2 =$	a. $5^5 \times 5^4 =$	b. Divide 81 into the ratio 5:4
c. $0 - {}^-4 =$	c. $24 \div {}^-8 =$	b. $(3^2)^6 =$	
d. $-3 + {}^-4 =$	d. $-64 \div 8 =$	c. $7^8 \div 7^5 =$	

| 5. ✎ a. Calculate $-3\left(-\frac{10}{11}\right)$ | 6. a. ✎ Convert $2\frac{1}{10}$ to a decimal. Round to 4 decimal places where necessary. | 7. ✎ Evaluate 0.578×0.16 | 8. ✎ Decrease 29 by 90%. |
| b. Calculate $-5 + \frac{7}{6}$ | b. Is $2\frac{1}{10}$ a recurring or terminating decimal? | | |

9. Simplify the following.	10. Simplify, give answers with positive powers.	11. a. Expand $2(6x - 2)$	12. a. Factorise $12x - 2$
a. $-a - 2 - 2$	a. $a^5 \times a^3 =$		
		b. Expand $-5(x + 1)$	b. Factorise $-18x - 12$
b. $-z \times -z$	b. $2x^4 \times 3x^5 =$		

| 13. ✎ Substitute $x = 2$ into $6x + 5$ and evaluate. | 14. ✎ Substitute $x = 40$ into $\frac{x}{4} - 9$ and evaluate. | 15. ✎ Substitute $x = 3$ into $-8x + 7$ and evaluate. | 16. ✎ Substitute $x = \frac{1}{5}$ into $3x + 5$ and evaluate. |

| 17. ✎ Solve the following: $3 = 7x - 11$ | 18. ✎ Solve the following: $18 = 3(x + 3)$ | 19. ✎ Solve the following: $6x + 7 = 2x + 27$ | 20. ✎ Solve the following: $4x + 10 = -2x + 7$ |

| 21. Consider the linear relationship $$y = 4x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = 4x - 3$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23 table
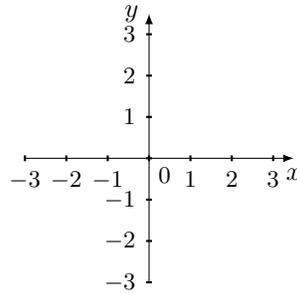
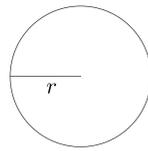| x	-1	0	1	2	3
y			6		10

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the area of the parallelogram.

9.6m
10m
19.8m

$A \approx$

---
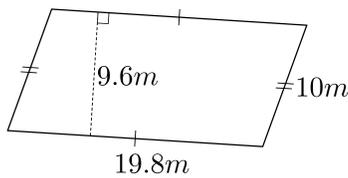
25. ✎ The circle below has a radius of 20.6cm. Calculate the following, giving answers to 2dp. where appropriate.

r

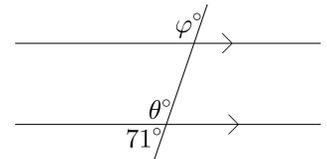a. diameter =

b. circumference =

c. area =

---

26. Consider the diagram below.

$\varphi°$
$\theta°$
$71°$

a. State the size of the unknown angles.
   $\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	4	14	18
C'	9	11	20
Total	13	25	38

a. P(C)=

b. P(not C)=

---

28. Calculate the following probabilities using the Venn diagram below.

C D
3   9   5
12
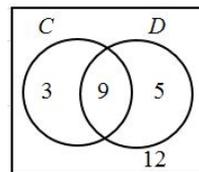
a. P(D)=

b. P(C or D or both)=

---

29. ✎ Calculate the following statistics for the below data set
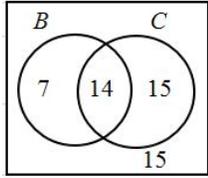
$$9, 1, 5, 4, 1$$

a. median =

b. mean =

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort

★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ An item costs $16.75 and Jacob pays with a $20 note. How much change will Jacob receive?	31. Consider the Venn diagram below. Which statement is true? **A.** $P(B) = \frac{7}{51}$ **B.** $P(B) = \frac{21}{51}$ **C.** $P(B) = \frac{7}{36}$ **D.** $P(B) = \frac{21}{36}$	32. ✎ What value of x completes this ratio statement? $$6 : x = 78 : 52$$
33. ✎ Calculate $85.48 - 7.6$	34. Simplify $6.6 : 2.2$	35. ✎ Rearrange $c = \frac{x}{a} + b$ to make a the subject.
36. ✎ A number is decreased by 50% and the result is 48.5. What was the original number?	37. ✎ The 18th term of an arithmetic sequence is 122 and the 30th term is 206. What are the first three terms of this sequence?	38. ✎ When 260 is divided by a positive integer N, the remainder is 5. List the possible values of N be?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-5 + 10 =$	2. a. $^-4 \times 2 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 28:35
b. $^-4 - 3 =$	b. $^-1 \times 2 =$	a. $6 \times 6^6 =$	b. Divide 21 into the ratio 2:1
c. $4 - {}^-3 =$	c. $^-40 \div {}^-8 =$	b. $(5^0)^6 =$	
d. $^-2 + {}^-6 =$	d. $^-7 \div 1 =$	c. $9^3 \div 9^2 =$	

| 5. ✎ a. Calculate $3\left(-\frac{3}{5}\right)$ | 6. a. ✎ Convert $\frac{1}{5}$ to a decimal. Round to 4 decimal places where necessary. | 7. ✎ Evaluate 19×0.498 | 8. ✎ Decrease 96 by 20%. |
| b. Calculate $-\frac{14}{9} - 5$ | b. Is $\frac{1}{5}$ a recurring or terminating decimal? | | |

| 9. Simplify the following.
 a. $-6z - 1 + 1$

 b. $6 \times -5c$ | 10. Simplify, give answers with positive powers.
 a. $b^5 \times b^2 =$

 b. $3y^2 \times 2y^4 =$ | 11. a. Expand $4(x+1)$

 b. Expand $-12(x+1)$ | 12. a. Factorise $15x + 12$

 b. Factorise $-9x + 9$ |

| 13. ✎ Substitute $x = 7$ into $8x + 5$ and evaluate. | 14. ✎ Substitute $x = 20$ into $\frac{x}{5} + 5$ and evaluate. | 15. ✎ Substitute $x = -5$ into $-4x - 5$ and evaluate. | 16. ✎ Substitute $x = \frac{1}{3}$ into $-5x + 1$ and evaluate. |

| 17. ✎ Solve the following:

 $53 = 8x - 3$ | 18. ✎ Solve the following:

 $2 = \dfrac{x}{6} - 2$ | 19. ✎ Solve the following:

 $4x + 5 = 3x + 9$ | 20. ✎ Solve the following:

 $-x - 6 = 6x + 1$ |

| 21. Consider the linear relationship $$y = 4x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = 4x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Table for Question 23:
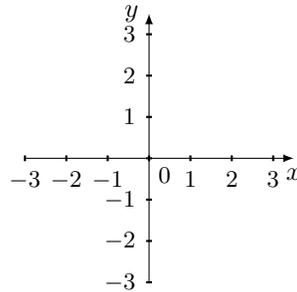
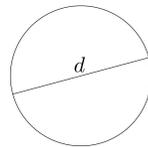| x	-1	0	1	2	3
y			12		22

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the triangle.
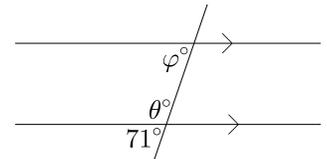

32.1m
13.9m
21.2m
21.3m

$A \approx$
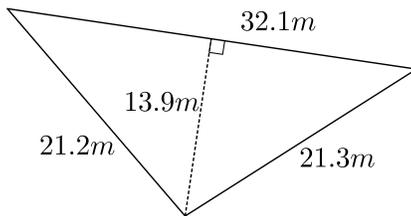
25. ✎ The circle below has a diameter of 24.8cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

b. circumference =

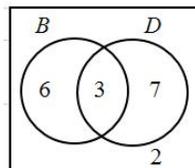c. area =

26. Consider the diagram below.

$\varphi°$
$\theta°$
71°

a. State the size of the unknown angles.
$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
D	8	7	15
D'	8	5	13
Total	16	12	28

a. P(A)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

B D
6 3 7
2

a. P(D)=

b. P(B and D)=

29. ✎ Calculate the following statistics for the below data set

$$6, 1, 7, 5, 6, 9, 4$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. ✎ Danish feta costs $14.99 per kilo. Rounding to the nearest cent, how much does 0.3kg cost?

31. ⊕ An appropriate first line of working when solving the equation $\frac{x-3}{5} = 2$ is:

A. $x - 3 = 2$

B. $x - 3 = 10$

C. $\frac{x}{5} = 2$

D. $\frac{x}{5} = 5$

32. Which of these points lies on the straight line joining the points $(2, 2)$ and $(18, 10)$?

A. $(3, 3)$)

B. $(4, 4)$

C. $((4, 8)$)

D. $(16, 9)$

33. ✎ Calculate $-20.05 + 77.22$

34. Find the value of x that makes the following equation true.

$$3 : 11 = x : 6$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

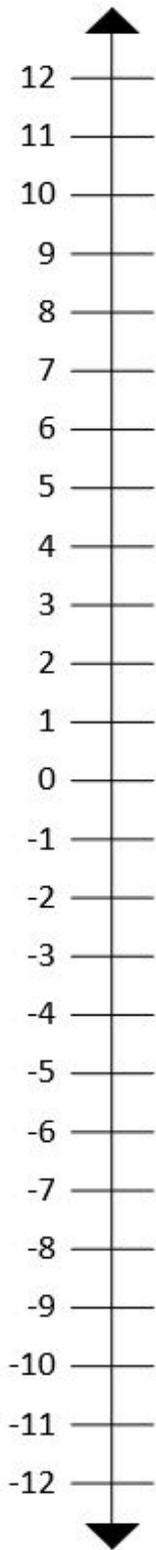| x	-1	0	1	2	3
y			-6		-7

$$y =$$

36. ✎ Determine the exact value of the radius of a circle which has an circumference of 45.3cm.

37. ✎ Express $\frac{159}{99}$ as a recurring decimal

38. ✎ The number 840 is the three digit number with the most number of factors. How many factors does it have?

Number line (vertical): 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1, -2, -3, -4, -5, -6, -7, -8, -9, -10, -11, -12

MULTIPLICATION GRID

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

PRIME NUMBERS

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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BOOK 4

Key Skills Training - L3+

name: _____

Welcome to the Key Skills Training Program for Schools. These sheets are designed to give you multiple opportunities to learn and revise key mathematical skills. Completing these sheets will help you become equipped with the skills you need to be a successful user of mathematics in school and also every day life. The following points will help you get the most out of the program. Enjoy!

- When you see the ✎ symbol include some working to support your answer. This could involve a calculation, annotating a diagram or an explanation of your thought process.

- All fractional answers must be given in simplified form.

- You may be able to complete very few questions or almost all of them, it doesn't matter. As long as you give your best effort and try to improve each time you are maximising your success!

- If you feel that some or all of these questions aren't suitable for you, have a chat with your teacher.

Time to get started on Sheet 1. Turn the page and complete the questions on pages 2, 3 and 4.

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-5 - 2 =$ b. $0 + 3 =$ c. $^-4 + ^-3 =$ d. $^-3 - ^-6 =$	2. a. $3 \times ^-4 =$ b. $^-1 \times ^-5 =$ c. $^-12 \div ^-2 =$ d. $24 \div ^-3 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $9^3 \times 9^5 =$ b. $5^8 \div 5^6 =$ c. $(9^2)^7 =$	4. a. Simplify 56:63 b. Divide 30 into the ratio 2:3
5. ✎ a. Calculate $-9\left(\frac{4}{5}\right)$ b. Calculate $-\frac{4}{3} - 3$	6. a. ✎ Convert $\frac{1}{7}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{1}{7}$ a recurring or terminating decimal?	7. ✎ Evaluate 3.9×19.5	8. ✎ Increase 30 by 90%.
9. Simplify the following. a. $y + 5y + y$ b. $-1 \times -3a$	10. Simplify, give answers with positive powers. a. $(y^5)^5 =$ b. $2y^4 \times 5y =$	11. a. Expand $2(4x - 4)$ b. Expand $-8(2x + 5)$	12. a. Factorise $12x - 15$ b. Factorise $-7x - 14$
13. ✎ Substitute $x = 4$ into $5x + 4$ and evaluate.	14. ✎ Substitute $x = 27$ into $\frac{x}{3} - 5$ and evaluate.	15. ✎ Substitute $x = -3$ into $-x - 4$ and evaluate.	16. ✎ Substitute $x = \frac{4}{5}$ into $1 - 5x$ and evaluate.
17. ✎ Solve the following: $22 = 6x - 2$	18. ✎ Solve the following: $6 = \dfrac{x - 9}{9}$	19. ✎ Solve the following: $2x - 5 = 3x - 7$	20. ✎ Solve the following: $4x - 1 = -x + 10$

| 21. Consider the linear relationship $$y = -5x - 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad , 0)$$	22. Sketch the graph of $y = -5x - 3$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

22.

23.
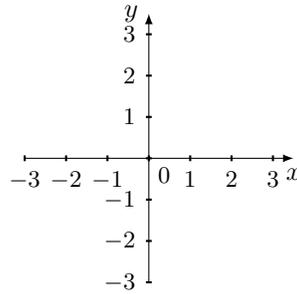
x	-1	0	1	2	3
y			0		10

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the trapezium.
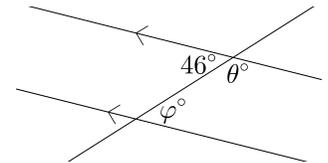

7cm
13cm
19cm

$A =$
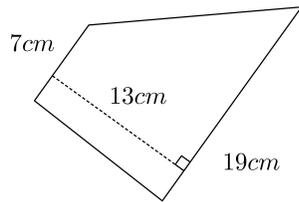
25. ✎ The circle below has a radius of 15.1cm. Calculate the following, giving answers to 2dp. where appropriate.
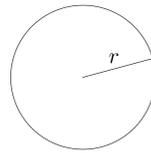
r

a. diameter =

b. circumference =

c. area =

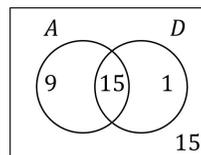**26.** Consider the diagram below.

46° θ°
φ°

a. State the size of the unknown angles.

$\theta° = \qquad \varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	14	3	17
D'	9	5	14
Total	23	8	31

a. P(C)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

A D
9   15   1
15

a. P(A)=

b. P(A and D)=

**29.** ✎ Calculate the following statistics for the below data set

$$2, 4, 6, 0, 8$$

a. median =

b. mean =

c. mode =

d. range =

30. Mia records temperatures on a mountain over four days. Which list gives the temperatures arranged in order from lowest to highest?

A. 0°C, -2°C, 3°C, -6°C

B. -2°C, -6°C, 0°C, 3°C

C. -6°C, 3°C, -2°C, 0°C

D. -6°C, -2°C, 0°C, 3°C

31. 🔘 ✎ The solution to the equation $-2x - 9 = 11$ is:

A. $x = -10$

B. $x = -1$

C. $x = 1$

D. $x = 10$

32. George drew this plan of a square block of land. All measurements are given in metres.
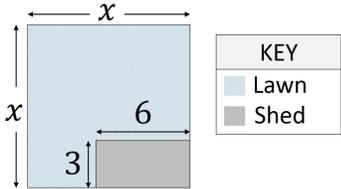
The area of the lawn in square metres is:

A. $x^2 - 18$

B. $x^2 + 18$

C. $2x^2 - 9$

D. $2x^2 - 18$

33. ✎ Calculate $3.32 + 76.2$

34. Find the value of x that makes the following equation true.

$$9 : 10 = x : 4$$

35. ✎ Rearrange $f + eh = g$ to make h the subject.

36. ✎ A number is decreased by 70% and the result is 14.1. What was the original number?

37. ✎ An arithmetic sequence begins with the numbers 4, 10, 16. What is the sum of the first 40 terms?

38. ✎ The four digits 1, 3, 5 and 7 are each used once only to form two numbers. Each of which is of one, two or three digits. What is the largest possible product two such numbers can have?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $2 - 7 =$	2. a. $5 \times {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 36:16
b. $^-2 + 1 =$	b. $^-7 \times 8 =$	a. $(3^8)^2 =$	b. Divide 12 into the ratio 2:1
c. $2 - {}^-6 =$	c. $^-16 \div {}^-8 =$	b. $\frac{2^7}{2^7} =$	
d. $^-5 + {}^-3 =$	d. $^-20 \div 5 =$	c. $7^5 \times 7^4 =$	

| 5. ✎ a. Calculate $-8\left(\frac{1}{6}\right)$

 b. Calculate $-2 + \frac{5}{4}$ | 6. a. ✎ Convert $1\frac{1}{2}$ to a decimal. Round to 4 decimal places where necessary.

 b. Is $1\frac{1}{2}$ a recurring or terminating decimal? | 7. ✎ Evaluate 4.4×3.65 | 8. ✎ Decrease 11 by 70%. |

| 9. Simplify the following.
 a. $-5 + 2 - 6a$

 b. $-2b \times -7$ | 10. Simplify, give answers with positive powers.
 a. $x \times x^3 =$

 b. $4y^5 \times y^4 =$ | 11. a. Expand $4(2x - 1)$

 b. Expand $-2(5x + 1)$ | 12. a. Factorise $8x + 12$

 b. Factorise $-8x - 16$ |

| 13. ✎ Substitute $x = 3$ into $6x - 4$ and evaluate. | 14. ✎ Substitute $x = 20$ into $\frac{x}{5} + 9$ and evaluate. | 15. ✎ Substitute $x = 8$ into $-2x - 3$ and evaluate. | 16. ✎ Substitute $x = \frac{2}{7}$ into $2 + 3x$ and evaluate. |

| 17. ✎ Solve the following:

 $5x + 4 = 14$ | 18. ✎ Solve the following:

 $77 = 7(x + 5)$ | 19. ✎ Solve the following:

 $x + 8 = 3x + 4$ | 20. ✎ Solve the following:

 $6x + 1 = 3x + 2$ |

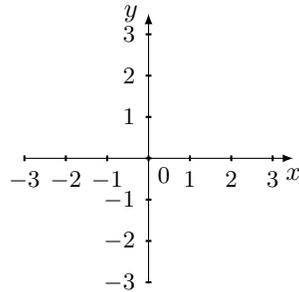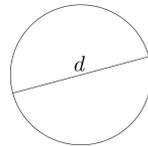| 21. Consider the linear relationship $$y = 5x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $$(0, \quad)$$ $$(\quad, 0)$$	22. Sketch the graph of $y = 5x + 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Table for Question 23:

x	-1	0	1	2	3
y			-9		-23

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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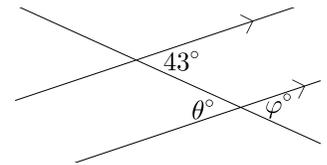**24.** ✎ To the nearest whole number calculate the area of the kite.

11cm

9cm

$A \approx$
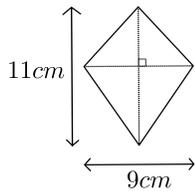
25. ✎ The circle below has a diameter of 17.8cm. Calculate the following, giving answers to 2dp. where appropriate.

d

a. radius =

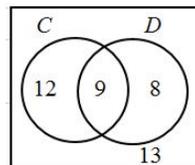b. circumference =

c. area =

26. Consider the diagram below.

43°

θ° φ°

a. State the size of the unknown angles.

$\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	6	10	16
C'	6	9	15
Total	12	19	31

a. P(C)=

b. P(B and C)=

28. Calculate the following probabilities using the Venn diagram below.

C D

12   9   8

13

a. P(D)=

b. P(not D)=

29. ✎ Calculate the following statistics for the below data set

$$6, 3, 3, 2, 9, 0, 5$$

a. median =

b. mean =

c. mode =

d. range =

30. ✎ Swimming pool entry costs $2.80 per child. How many children can entre for $30? **A.** 10 **B.** 11 **C.** 12 **D.** 84	31. ⊛ The value of $^-21 \div 7$ is: **A.** $^-14$ **B.** $^-3$ **C.** 3 **D.** 14	32. Juno has to find the value of the epression below **without** a calculator. $$30 - 14 \times \sqrt{2.8 + 6.2}$$ Which calculation does she do first? **A.** $30 - 14$ **B.** 14×2.8 **C.** $\sqrt{2.8}$ **D.** $2.8 + 6.2$
33. ✎ Calculate $5.5 - 23.25$	34. Simplify $2\frac{1}{3} : 1\frac{2}{3}$	35. ✎ Rearrange $ps + q = r$ to make s the subject.
36. ✎ Determine the exact value of the radius of a circle which has an circumference of 32.9cm.	37. ✎ An arithmetic sequence begins with the numbers 23, 16, 9. What is the sum of the first 31 terms?	38. ✎ How many numbers less than 10 000 have the product of their digits equal to 60?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-1 - 6 =$
 	
 b. $^-2 + 4 =$
 	
 c. $^-4 - ^-3 =$
 	
 d. $^-2 + ^-1 =$
	2. a. $^-5 \times ^-1 =$
	
	 b. $7 \times ^-4 =$
	
	 c. $42 \div ^-6 =$
	
	 d. $21 \div ^-3 =$
		3. Simplify the following, giving your answer in index form where appropriate.
		    a. $(6^5)^2 =$
		    b. $\frac{4^4}{4^2} =$
		    c. $8^3 \times 8^4 =$
			4. a. Simplify 10:5
			
			 b. Divide 40 into the ratio 5:3

5. ✎ a. Calculate $6\left(-\frac{3}{10}\right)$ b. Calculate $-2 - \frac{16}{9}$	6. a. ✎ Convert $\frac{3}{7}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{3}{7}$ a recurring or terminating decimal?	7. ✎ Evaluate 36.9×57	8. ✎ Decrease 63 by 70%.
9. Simplify the following. a. $-3 + 6 - 7a$ b. $5 \times -3a$	10. Simplify, give answers with positive powers. a. $\frac{y^7}{y^6} =$ b. $(2s^2)^2 =$	11. a. Expand $2(6x + 6)$ b. Expand $-5(2x + 2)$	12. a. Factorise $8x - 4$ b. Factorise $-20x + 16$
13. ✎ Substitute $x = 5$ into $8x - 16$ and evaluate.	14. ✎ Substitute $x = 8$ into $\frac{x-4}{2}$ and evaluate.	15. ✎ Substitute $x = -9$ into $5x - 2$ and evaluate.	16. ✎ Substitute $x = \frac{1}{8}$ into $-3x - 3$ and evaluate.
17. ✎ Solve the following: $2x + 4 = 10$	18. ✎ Solve the following: $\frac{x-2}{6} = 3$	19. ✎ Solve the following: $5x - 2 = 3x + 8$	20. ✎ Solve the following: $13 = 4(x - 5)$

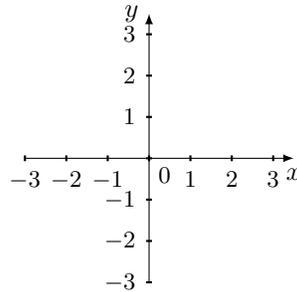| 21. Consider the linear relationship $$y = -x + 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0,\ \ )$ $(\ ,\ 0)$ | 22. Sketch the graph of $y = -x + 2$. Label the axis intercepts 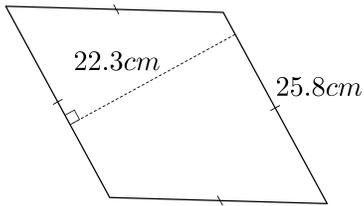using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below.

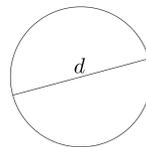| x	-1	0	1	2	3
y		5			-1

$$y =$$ |

Step 2: ★ Complete these 6 questions ★ You may use a calculator

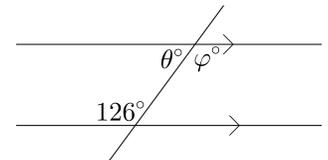| 24. ✎ To the nearest whole number calculate the area of the rhombus. $A \approx$ | 25. ✎ The circle below has a diameter of 17.4cm. Calculate the following, giving answers to 2dp. where appropriate. a. radius = b. circumference = c. area = | 26. Consider the diagram below. a. State the size of the unknown angles. $\theta° =$ $\varphi° =$ b. What is the relationship between θ and φ? |

| 27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	6	13	19
C'	5	13	18
Total	11	26	37
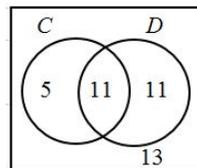
a. P(A)= b. P(not A)= | 28. Calculate the following probabilities using the Venn diagram below. a. P(C)= b. P(C and D)= | 29. ✎ Calculate the following statistics for the below data set $$8, 5, 8, 2, 1, 5, 3, 7$$ a. median = b. mean to 1 dp. $\approx$ c. mode = d. range = |

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Step 3: ★ Complete the challenge questions below with your best effort
★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ The height of a river is shown on a marker, with the level at which it floods marked as zero. Due to heavy rain the river changed from -3.8m to 2.7m. By how many metres had the river level changed?

31. ⊕ ✎ Evaluating $\frac{3}{4} + \frac{1}{5}$ gives

A. $\frac{4}{9}$

B. $\frac{1}{20}$

C. $\frac{4}{20}$

D. $\frac{19}{20}$

32. ✎ Sai bought a bike on sale at 15% off the original price. The original price was \$380. How much did Sai pay for the bike?

A. \$57

B. \$323

C. \$342

D. \$365

33. Calculate $(-5)^4$

34. Simplify $1.8 : 1.98$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y		-4		1	

$$y =$$

36. ✎ Determine the exact value of the diameter of a circle which has an circumference of 53.5cm.

37. ✎ Express $0.00\overline{4}$ as a fraction

38. ✎ If p and q are positive integers and $p + q < 12$, how many different values can the product pq take?

| mathsquad | Key Skills Training Level 3+ | Name: |
| | Sheet 4 | Due date: |

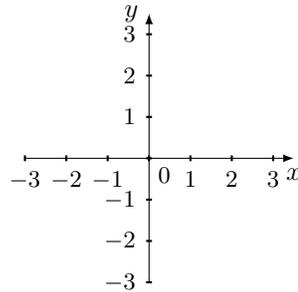|			

1. a. $0 - 5 =$
 	
b. $^-3 + 1 =$
 	
c. $^-3 + ^-1 =$
 	
d. $^-2 - ^-2 =$
	2. a. $^-5 \times 2 =$
	
	b. $^-3 \times ^-5 =$
	
	c. $0 \div ^-6 =$
	
	d. $4 \div ^-1 =$
		3. Simplify the following, giving your answer in index form where appropriate.
		  a. $6 \times 6^2 =$
		  b. $5^7 \div 5^5 =$
		  c. $(3^4)^2 =$
			4. a. Simplify 60:66
			
			b. Divide 120 into the ratio 9:1

5. ✎ a. Calculate $7\left(-\frac{1}{5}\right)$ b. Calculate $\frac{5}{3} - 4$	6. a. ✎ Convert $\frac{4}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{4}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 2.4×56.8	8. ✎ Increase 43 by 8%.
9. Simplify the following. a. $-2y - 7y - y$ b. $-1 \times -4a$	10. Simplify, give answers with positive powers. a. $\frac{b^6}{b^5} =$ b. $\frac{8q^7}{2q^4} =$	11. a. Expand $3(4x - 5)$ b. Expand $-9(x - 3)$	12. a. Factorise $4x - 12$ b. Factorise $-27 - 45x$
13. ✎ Substitute $x = 2$ into $4x - 5$ and evaluate.	14. ✎ Substitute $x = 5$ into $5(x + 2)$ and evaluate.	15. ✎ Substitute $x = -5$ into $9 + 2x$ and evaluate.	16. ✎ Substitute $x = \frac{5}{6}$ into $4 - 2x$ and evaluate.
17. ✎ Solve the following: $22 = 9x - 5$	18. ✎ Solve the following: $3(x - 3) = 3$	19. ✎ Solve the following: $6x - 3 = 5x + 2$	20. ✎ Solve the following: $3(x - 2) = 8$

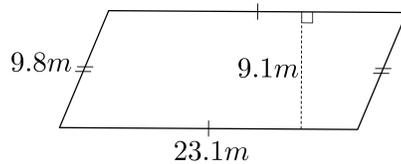| 21. Consider the linear relationship $$y = 2x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = 2x + 3$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23 table:

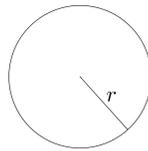| x	-1	0	1	2	3
y		2			-7

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

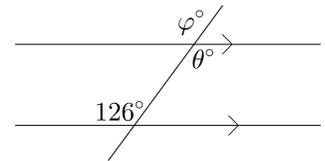| 24. ✎ To the nearest whole number calculate the perimeter of the parallelogram. $P \approx$ | 25. ✎ The circle below has a radius of 15.5cm. Calculate the following, giving answers to 2dp. where appropriate. a. diameter = b. circumference = c. area = | 26. Consider the diagram below. a. State the size of the unknown angles. $\theta° =$ $\varphi° =$ b. What is the relationship between θ and φ? |

| 27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	3	3	6
C'	3	11	14
Total	6	14	20

a. P(C)=
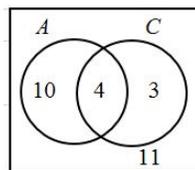
b. P(A and C)= | 28. Calculate the following probabilities using the Venn diagram below. a. P(A)= b. P(A and C)= | 29. ✎ Calculate the following statistics for the below data set $$6, 7, 3, 3, 8, 2, 8, 5$$ a. median = b. mean to 1 dp. $\approx$ c. mode = d. range = |

30. ✎ How many hours and minutes are between 4:26am and 4:08pm on the same day?

A. 11 hours and 18 minutes

B. 11 hours and 42 minutes

C. 12 hours and 18 minutes

D. 12 hours and 42 minutes

31. ⊛ The value of $^-3 - 4$ is:

A. $^-7$

B. $^-1$

C. 1

D. 7

32. ✎ In a class of 24 students, the ratio of boys to girls is 1:2. Four extra boys and 1 extra girl join the class. What is the new ratio of boys to girls?

33. ✎ Calculate $\frac{1}{3} + \frac{1}{2}$

34. Find the value of x that makes the following equation true.

$$8 : 12 = 7 : x$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

x	-1	0	1	2	3
y			5		8

$$y =$$

36. ✎ Determine the exact value of the diameter of a circle which has an area of 43cm^2.

37. ✎ Express $\frac{139}{25}$ as a terminating decimal

38. ✎ What is the first year after 2000 which is the product of 2 consecutive integers?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-3 - 2 =$ b. $^-5 + 6 =$ c. $5 - {^-1} =$ d. $4 + {^-3} =$	2. a. $^-4 \times 8 =$ b. $8 \times {^-4} =$ c. $56 \div 8 =$ d. $0 \div {^-3} =$	3. Simplify the following, giving your answer in index form where appropriate. a. $7^5 \times 7^2 =$ b. $(3^5)^2 =$ c. $9^8 \div 9^6 =$	4. a. Simplify 10:5 b. Divide 32 into the ratio 3:5
5. ✎ a. Calculate $-2\left(\frac{3}{4}\right)$ b. Calculate $\frac{18}{11} - 5$	6. a. ✎ Convert $1\frac{9}{10}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{9}{10}$ a recurring or terminating decimal?	7. ✎ Evaluate 36.7×17	8. ✎ Increase 55 by 6%.
9. Simplify the following. a. $4x + 4x - 1$ b. $y \times -5$	10. Simplify, give answers with positive powers. a. $x^2 \times x =$ b. $\frac{9b^4}{12b^2} =$	11. a. Expand $3(2x - 2)$ b. Expand $-10(2x + 4)$	12. a. Factorise $8x + 4$ b. Factorise $-55 + 11x$
13. ✎ Substitute $x = 4$ into $6x - 17$ and evaluate.	14. ✎ Substitute $x = 40$ into $\frac{x}{5} - 2$ and evaluate.	15. ✎ Substitute $x = -7$ into $-8x + 7$ and evaluate.	16. ✎ Substitute $x = \frac{11}{12}$ into $5 - 5x$ and evaluate.
17. ✎ Solve the following: $8x - 31 = 17$	18. ✎ Solve the following: $3(x - 6) = 3$	19. ✎ Solve the following: $5x - 3 = 2x + 9$	20. ✎ Solve the following: $7 = 3(x - 2)$

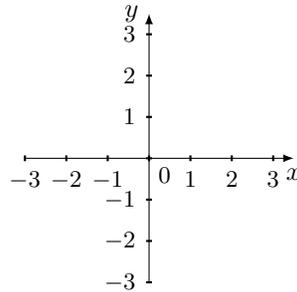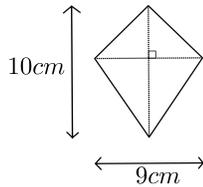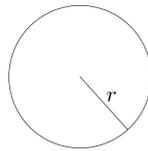| 21. Consider the linear relationship

$$y = 3x - 2$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\quad , 0)$ | 22. Sketch the graph of $y = 3x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.

 | 23. The points below satisfy a linear relationship. Complete the table and rule below.

| x | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|
| y | | 5 | | | -4 |

$y =$ |

Step 2: ★ Complete these 6 questions ★ You may use a calculator

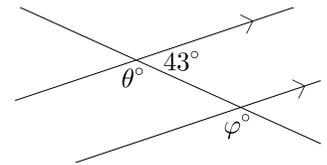| 24. ✎ To the nearest whole number calculate the area of the kite.

$A =$ | 25. ✎ The circle below has a radius of 20.7cm. Calculate the following, giving answers to 2dp. where appropriate.

a. diameter =

b. circumference =

c. area = | 26. Consider the diagram below.

a. State the size of the unknown angles.
$\theta° = \qquad \varphi° =$
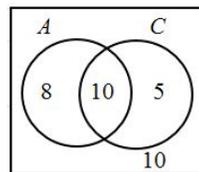
b. What is the relationship between θ and φ? |
27. Calculate the following probabilities using the two-way table below. |	B	B'	Total
C	9	14	23
C'	8	3	11
Total	17	17	34 | a. P(B)= b. P(not B)=	28. Calculate the following probabilities using the Venn diagram below. a. P(C)= b. P(not A)=	29. ✎ Calculate the following statistics for the below data set $$4, 3, 9, 1, 4, 4, 5$$ a. median = b. mean to 1 dp. $\approx$ c. mode = d. range =

30. ✎ On sale leg ham costs \$8.50 per kilo and the sign says that this is a saving of \$2.99 per kilo. How much did one kilo of leg ham cost before it was on sale?	31. ⊞ ✎ Evaluating $\frac{5}{6} \div \frac{1}{4}$ gives: **A.** $\frac{3}{10}$ **B.** $\frac{10}{3}$ **C.** $\frac{5}{24}$ **D.** $\frac{24}{5}$	32. Which expression is equivalent to $2^3 \times 4^2$ **A.** $2 \times 3 \times 4 \times 2$ **B.** $2 \times 2 \times 2 \times 2 \times 2$ **C.** $2 \times 2 \times 2 \times 2 \times 4 \times 2$ **D.** $2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$
33. Calculate $(-5)^1$	34. Simplify $\frac{3}{4} : 1\frac{1}{2}$	35. ✎ Rearrange $ps - q = r$ to make p the subject.
36. ✎ A number is decreased by 60% and the result is 30.4. What was the original number?	37. ✎ The 1st term of an arithmetic sequence is 16 and the 2nd term is 10. What is the term number of -506?	38. ✎ Note that $1 + 2 + 3 + 45 + 6 + 78 = 135$. In how many *other* ways is it possible to make a total of 135 using only 1, 2, 3, 4, 5, 6, 7 and 8 in that order with addition signs?

| mathsquad | Key Skills Training Level 3+ | Name: |
| | Sheet 6 | Due date: |

1. a. $^-4 + 4 =$	2. a. $5 \times {}^-1 =$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 55:50
b. $^-1 - 3 =$	b. $2 \times {}^-5 =$	a. $3^3 \times 3^2 =$	b. Divide 3 into the ratio 1:2
c. $^-1 + {}^-2 =$	c. $10 \div {}^-5 =$	b. $4^8 \div 4^6 =$	
d. $^-6 - {}^-2 =$	d. $^-32 \div 8 =$	c. $(7^5)^5 =$	

| 5. ✎ a. Calculate $-8\left(-\frac{4}{5}\right)$ | 6. a. ✎ Convert $\frac{5}{6}$ to a decimal. Round to 4 decimal places where necessary. | 7. ✎ Evaluate 14×4.67 | 8. ✎ Increase 63 by 40%. |
| b. Calculate $-\frac{23}{12} + 2$ | b. Is $\frac{5}{6}$ a recurring or terminating decimal? | | |

| 9. Simplify the following. a. $4y + 6y - 4$ | 10. Simplify, give answers with positive powers. a. $\frac{b^4}{b} =$ | 11. a. Expand $3(4x - 6)$ | 12. a. Factorise $18x + 6$ |
| b. $-7c \times -3$ | b. $\frac{10b^8}{2b} =$ | b. Expand $-(2x + 4)$ | b. Factorise $-20 + 5x$ |

| 13. ✎ Substitute $x = 5$ into $9x - 2$ and evaluate. | 14. ✎ Substitute $x = 48$ into $\frac{x}{6} - 7$ and evaluate. | 15. ✎ Substitute $x = -8$ into $3 + 7x$ and evaluate. | 16. ✎ Substitute $x = \frac{5}{12}$ into $4x + 1$ and evaluate. |

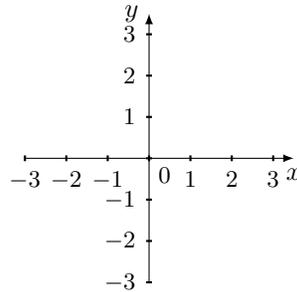| 17. ✎ Solve the following: $25 = 4x + 5$ | 18. ✎ Solve the following: $3(x + 4) = 21$ | 19. ✎ Solve the following: $4x + 7 = 2x + 15$ | 20. ✎ Solve the following: $26 = 6(x - 9)$ |

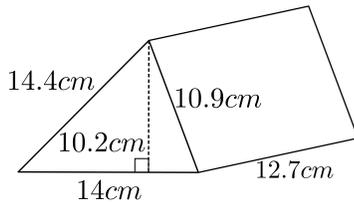| 21. Consider the linear relationship $$y = 2x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = 2x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

23 table:

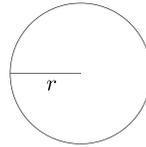| x	-1	0	1	2	3
y			12		24

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

24. ✎ To the nearest whole number calculate the volume of the triangular prism.

14.4cm
10.9cm
10.2cm
14cm
12.7cm

$V \approx$

25. ✎ The circle below has a radius of 6.4cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

43°
$\theta°$
$\varphi°$

a. State the size of the unknown angles.
$\theta° =$ $\varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	13	14	27
C'	14	4	18
Total	27	18	45

a. P(B)=

b. P(not B)=

28. Calculate the following probabilities using the Venn diagram below.

B D
2 7 4
15

a. P(D)=
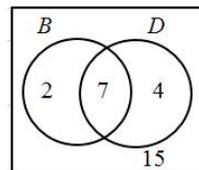
b. P(B and D)=

29. ✎ Calculate the following statistics for the below data set

$$5, 5, 6, 0, 9, 9, 0$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. What time is shown on the clock?

A. 12:07

B. 12:35

C. 7:00

D. 7:12

31. Consider the two-way table below.

	A	A'	Total
D	8	7	15
D'	8	5	13
Total	16	12	28

Which statement is true?

A. $P(A \text{ and } D) = \frac{5}{28}$

B. $P(A \text{ and } D) = \frac{8}{28}$

C. $P(A \text{ and } D) = \frac{23}{28}$

D. $P(A \text{ and } D) = \frac{31}{28}$

32. ✎ The volume of a cone is given by the rule $V = \frac{\pi r^2 h}{3}$ where r is the radius of the cone and h is the height of the cone. The cone below has a radius of 3cm and a height of 8cm.
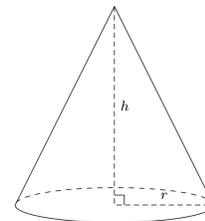
The volume of the cone is closest to

A. 25cm^3

B. 50cm^3

C. 75cm^3

D. 100cm^3

33. ✎ Calculate $-\frac{9}{10} + \frac{5}{10}$

34. Simplify $3.36 : 1.4$

35. ✎ Rearrange $a(x - b) = c$ to make a the subject.

36. ✎ Determine the exact value of the diameter of a circle which has an circumference of 58.3cm.

37. ✎ An arithmetic sequence begins with the numbers 16, 23, 30. What is the sum of the first 34 terms?

38. ✎ At a party each person shook hands exactly once with each of the others. If 45 handshakes were exchanged, how many people were at the party?

mathsquad

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-5 - 2 =$ b. $^-4 + 2 =$ c. $2 - {}^-2 =$ d. $5 + {}^-6 =$	2. a. $7 \times {}^-6 =$ b. $6 \times {}^-8 =$ c. $24 \div {}^-8 =$ d. $^-8 \div {}^-1 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $\frac{5^7}{5^2} =$ b. $(8^2)^5 =$ c. $7 \times 7^6 =$	4. a. Simplify 9:18 b. Divide 44 into the ratio 5:6
5. ✎ a. Calculate $-6\left(\frac{2}{3}\right)$ b. Calculate $5 - \frac{8}{3}$	6. a. ✎ Convert $\frac{6}{7}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{6}{7}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.14×3.78	8. ✎ Decrease 18 by 90%.
9. Simplify the following. a. $6 - 6b - 5b$ b. $-3 \times 2a$	10. Simplify, give answers with positive powers. a. $b^2 \times b^2 =$ b. $(y^2)^2 =$	11. a. Expand $4(5x - 4)$ b. Expand $-2(4x - 1)$	12. a. Factorise $12x - 4$ b. Factorise $-8x + 20$
13. ✎ Substitute $x = 7$ into $7x - 25$ and evaluate.	14. ✎ Substitute $x = 34$ into $\frac{x+8}{6}$ and evaluate.	15. ✎ Substitute $x = 2$ into $-9x - 7$ and evaluate.	16. ✎ Substitute $x = \frac{5}{7}$ into $-4x - 1$ and evaluate.
17. ✎ Solve the following: $4 = 3x - 2$	18. ✎ Solve the following: $8 = 8(x - 1)$	19. ✎ Solve the following: $5x + 10 = 3x + 14$	20. ✎ Solve the following: $3x - 6 = 4x + 7$

| 21. Consider the linear relationship $$y = 4x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\ , 0)$ | 22. Sketch the graph of $y = 4x - 2$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |

23.
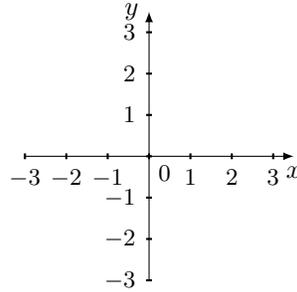
x	-1	0	1	2	3
y			2		-4

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

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24. ✎ To the nearest whole number calculate the volume of the rectangular prism.

4.9cm   9cm
11.5cm

$V \approx$
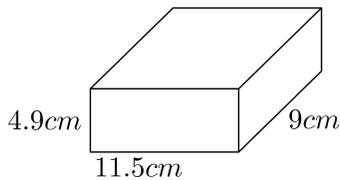
25. ✎ The circle below has a radius of 24.9cm. Calculate the following, giving answers to 2dp. where appropriate.

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

$\varphi° / \theta°$
$126°$

a. State the size of the unknown angles.
   $\theta° =$ \qquad $\varphi° =$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	14	13	27
D'	11	15	26
Total	25	28	53

a. P(C)=

b. P(not D)=

28. Calculate the following probabilities using the Venn diagram below.

B \qquad D
4 \quad 15 \quad 11
5

a. P(D)=

b. P(not D)=

29. ✎ Calculate the following statistics for the below data set

$$0, 9, 4, 1, 5$$

a. median =

b. mean to 1 dp. =

c. mode =

d. range =

30. ✎ Leg ham regularly costs \$11.49 per kilo. If it goes on sale to \$8.50 per kilo, by how much has the price been reduced?

31. ⊛ ✎ Evaluating $\sqrt{25 - 16}$ gives:

A. -11

B. 3

C. 4.5

D. 21

32. Here is a table of values for x and y.

x	0	0.5	1	1.5	2
y	0	1	4	9	16

Which of the following rules connects these points?

A. $y = x$

B. $y = 2x$

C. $y = x^2$

D. $y = 4x^2$

33. ✎ Calculate $-40.18 - 8.64$

34. Simplify $1 : 1.2$

35. ✎ Rearrange $\frac{s-p}{q} = r$ to make p the subject.

36. ✎ Determine the exact value of the diameter of a circle which has an circumference of 50.5cm.

37. ✎ Express $\frac{13}{400}$ as a terminating decimal

38. ✎ January first 1986 was a Wednesday. When was the next time the first day of the year fell on a Wednesday?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

|			
1. a. $^-5 + 3 =$ b. $^-2 - 5 =$ c. $^-5 + {}^-2 =$ d. $^-5 - {}^-6 =$	2. a. $3 \times {}^-6 =$ b. $7 \times {}^-4 =$ c. $40 \div {}^-8 =$ d. $8 \div {}^-2 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $2^2 \times 2 =$ b. $9^5 \div 9^4 =$ c. $(2^0)^2 =$	4. a. Simplify 66:77 b. Divide 189 into the ratio 11:10
5. ✎ a. Calculate $-7\left(\frac{1}{3}\right)$ b. Calculate $-\frac{4}{3} + 5$	6. a. ✎ Convert $\frac{9}{11}$ to a decimal. Round to 4 decimal places where necessary. b. Is $\frac{9}{11}$ a recurring or terminating decimal?	7. ✎ Evaluate 0.557×0.47	8. ✎ Increase 15 by 6%.
9. Simplify the following. a. $-1 - 2 - 3x$ b. $-2y \times -1$	10. Simplify, give answers with positive powers. a. $\frac{a^7}{a^4} =$ b. $\frac{2b^4}{3b} =$	11. a. Expand $3(2x - 4)$ b. Expand $-12(3x + 3)$	12. a. Factorise $20x + 8$ b. Factorise $-25 - 10x$
13. ✎ Substitute $x = 3$ into $8x - 2$ and evaluate.	14. ✎ Substitute $x = 7$ into $\frac{x+8}{3}$ and evaluate.	15. ✎ Substitute $x = -2$ into $-x - 6$ and evaluate.	16. ✎ Substitute $x = \frac{7}{9}$ into $-2x - 2$ and evaluate.
17. ✎ Solve the following: $53 = 7x + 4$	18. ✎ Solve the following: $\frac{x}{3} - 2 = 2$	19. ✎ Solve the following: $5x - 7 = 2x + 11$	20. ✎ Solve the following: $13 = 3(x - 3)$

| 21. Consider the linear relationship $$y = -x + 3$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$ | 22. Sketch the graph of $y = -x + 3$. Label the axis intercepts using your answers from Question 21 to assist you. | 23. The points below satisfy a linear relationship. Complete the table and rule below. |
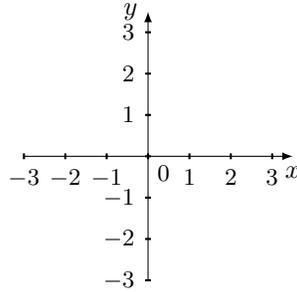
23 table:

x	-1	0	1	2	3
y	-2			-14	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator
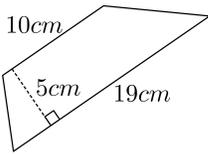
24. ✎ To the nearest whole number calculate the area of the trapezium.	25. ✎ The circle below has a radius of 20.8cm. Calculate the following, giving answers to 2dp. where appropriate.	26. Consider the diagram below.

24.
10cm, 5cm, 19cm

$A \approx$

25.

a. diameter =

b. circumference =

c. area =

26.

$\theta° \quad \varphi°$

71°

a. State the size of the unknown angles.
$$\theta° = \qquad \varphi° =$$

b. What is the relationship between θ and φ?

27. Calculate the following probabilities using the two-way table below.

	A	A'	Total
C	11	12	23
C'	14	4	18
Total	25	16	41

a. P(C)=

b. P(not A)=

28. Calculate the following probabilities using the Venn diagram below.

B 15 (7) 7 C
5

a. P(B)=
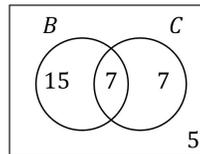
b. P(not C)=

29. ✎ Calculate the following statistics for the below data set

$$6, 8, 5, 3, 1, 0, 1$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

30. What time is shown on the clock?

A. 6:10

B. 6:50

C. 7:10

D. 7:50

31. Consider the diagram below.
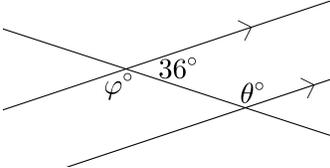
Which statement is true?

A. θ and φ are co-interior and add to 180 degrees

B. θ and φ are co-interior and are equal

C. θ and φ are alternate and add to 180 degrees

D. θ and φ are alternate and are equal

32. ✎ A rule for y in terms of x is $y = 5 - 4x$. When $x = 1.75$ the value of y is:

A. -2

B. -1.75

C. 1.75

D. 2

33. Calculate $(-1)^{83}$

34. Simplify $1 : 3\frac{1}{4}$

35. ✎ Rearrange $\frac{x+a}{b} = c$ to make a the subject.

36. ✎ A number is decreased by 90% and the result is 8.7. What was the original number?

37. ✎ Express $\frac{71}{250}$ as a terminating decimal

38. ✎ Today my three cousins multipled their ages together and it came to 1760. This day last year their ages multipled to 1260. When they multiplied their ages together two years ago today, what was their answer?

	Key Skills Training Level 3+	Name:
mathsquad	Sheet 9	Due date:

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-3+7=$	2. a. $4\times{}^-1=$	3. Simplify the following, giving your answer in index form where appropriate.	4. a. Simplify 24:12
b. $^-5-2=$	b. $^-6\times{}^-3=$	a. $8^6\times8^5=$	b. Divide 187 into the ratio 7:10
c. $^-2+{}^-2=$	c. $6\div{}^-1=$	b. $(9^7)^4=$	
d. $^-3-{}^-4=$	d. $4\div{}^-1=$	c. $6^4\div6^2=$	

5. ✎ a. Calculate $-7\left(\frac{9}{11}\right)$	6. a. ✎ Convert $\frac{1}{11}$ to a decimal. Round to 4 decimal places where necessary.	7. ✎ Evaluate 0.28×58.8	8. ✎ Decrease 91 by 6%.
b. Calculate $-5-\frac{9}{7}$	b. Is $\frac{1}{11}$ a recurring or terminating decimal?		

9. Simplify the following. a. $-3y-5-5$	10. Simplify, give answers with positive powers. a. $(b^4)^4=$	11. a. Expand $3(3x-2)$	12. a. Factorise $24x+24$
b. $y\times-2$	b. $(3s^4)^3=$	b. Expand $-11(3x-4)$	b. Factorise $-8+12x$

13. ✎ Substitute $x=7$ into $9x-41$ and evaluate.	14. ✎ Substitute $x=6$ into $9(x-2)$ and evaluate.	15. ✎ Substitute $x=-3$ into $-4x-2$ and evaluate.	16. ✎ Substitute $x=\frac{3}{11}$ into $5x+5$ and evaluate.

17. ✎ Solve the following: $4=8x-52$	18. ✎ Solve the following: $\frac{x}{3}+5=8$	19. ✎ Solve the following: $4x+1=3x+6$	20. ✎ Solve the following: $16=3(x+7)$

21. Consider the linear relationship $$y = 2x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\quad, 0)$	22. Sketch the graph of $y = 2x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.	23. The points below satisfy a linear relationship. Complete the table and rule below.

Question 23 table:
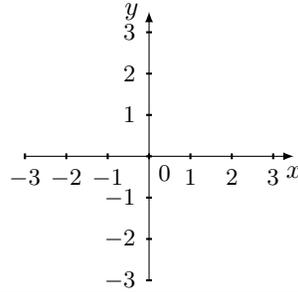
x	-1	0	1	2	3
y	0			-18	

$$y =$$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the trapezium.

9cm

14cm

22cm

$A =$
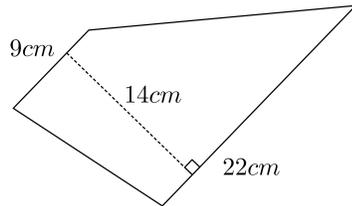
25. ✎ The circle below has a radius of 28.3cm. Calculate the following, giving answers to 2dp. where appropriate.

r

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

φ° 129°

θ°

a. State the size of the unknown angles.

$\theta^\circ =$ $\varphi^\circ =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	B	B'	Total
C	4	8	12
C'	10	15	25
Total	14	23	37

a. P(C)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

A B

13 12 4

3

a. P(A)=
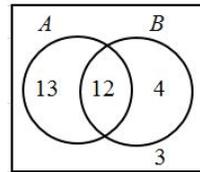
b. P(A and B)=

29. ✎ Calculate the following statistics for the below data set

$$9, 6, 5, 2, 2, 6, 5$$

a. median =

b. mean =

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort
★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ How many minutes are there is 5 and a half hours?	31. ⊞ ✎ The point $(a, 0)$ satisfies the linear relationship $y = 2x - 7$. What is the value of a? **A.** $\frac{2}{7}$ **B.** $-\frac{2}{7}$ **C.** $\frac{7}{2}$ **D.** $-\frac{7}{2}$	32. ⊞ ✎ Which ratio represents one quarter hours to 90 minutes in simplest form? **A.** 1:5 **B.** 1:6 **C.** 1:9 **D.** 15:90
33. Calculate $(-1)^{29}$	34. Find the value of x that makes the following equation true. $$5 : 2 = x : 5$$	35. ✎ Rearrange $g = \frac{h}{e} + f$ to make e the subject.
36. ✎ A number is decreased by 10% and the result is 34.2. What was the original number?	37. ✎ Express $\frac{92}{80}$ as a terminating decimal	38. ✎ At a party each person shook hands exactly once with each of the others. If 15 people were at the party, how many handshakes were exchanged?

Step 1: ★ Complete these 23 question. ★ Do not use a calculator

1. a. $^-1 - 2 =$ b. $^-2 + 3 =$ c. $^-4 + {}^-2 =$ d. $^-2 - {}^-1 =$	2. a. $4 \times {}^-1 =$ b. $4 \times {}^-1 =$ c. $12 \div {}^-6 =$ d. $40 \div {}^-8 =$	3. Simplify the following, giving your answer in index form where appropriate. a. $9^7 \times 9^2 =$ b. $6^3 \div 6^2 =$ c. $(4^3)^2 =$	4. a. Simplify 25:30 b. Divide 91 into the ratio 9:4
5. ✎ a. Calculate $-2\left(\frac{2}{5}\right)$ b. Calculate $-\frac{14}{9} - 4$	6. a. ✎ Convert $1\frac{1}{4}$ to a decimal. Round to 4 decimal places where necessary. b. Is $1\frac{1}{4}$ a recurring or terminating decimal?	7. ✎ Evaluate 1.96×0.49	8. ✎ Decrease 43 by 20%.
9. Simplify the following. a. $-4 - 2 + 3a$ b. $-1 \times 2x$	10. Simplify, give answers with positive powers. a. $(b^3)^4 =$ b. $(2y^3)^4 =$	11. a. Expand $2(6x + 2)$ b. Expand $-4(4x - 5)$	12. a. Factorise $12x + 4$ b. Factorise $-35x + 7$
13. ✎ Substitute $x = 4$ into $3x - 10$ and evaluate.	14. ✎ Substitute $x = 29$ into $\frac{x-5}{8}$ and evaluate.	15. ✎ Substitute $x = -7$ into $6x - 1$ and evaluate.	16. ✎ Substitute $x = \frac{1}{3}$ into $-4x + 3$ and evaluate.
17. ✎ Solve the following: $71 = 8 + 9x$	18. ✎ Solve the following: $10 = 5(x - 3)$	19. ✎ Solve the following: $x + 9 = 3x + 5$	20. ✎ Solve the following: $21 = 4(x - 4)$

21. Consider the linear relationship $$y = 2x - 2$$ Complete the missing value in each coordinate so each satisfies the given relationship. $(0, \quad)$ $(\ , 0)$

21. Consider the linear relationship

$$y = 2x - 2$$

Complete the missing value in each coordinate so each satisfies the given relationship.

$(0, \quad)$

$(\ , 0)$

22. Sketch the graph of $y = 2x - 2$. Label the axis intercepts using your answers from Question 21 to assist you.

23. The points below satisfy a linear relationship. Complete the table and rule below.

x	-1	0	1	2	3
y			8		20

$y =$

Step 2: ★ Complete these 6 questions ★ You may use a calculator

---

24. ✎ To the nearest whole number calculate the area of the parallelogram.

19.5cm

10.7cm 7.3cm

$A \approx$

25. ✎ The circle below has a radius of 18.3cm. Calculate the following, giving answers to 2dp. where appropriate.

a. diameter =

b. circumference =

c. area =

26. Consider the diagram below.

$36°$

$\theta°$

$\varphi°$

a. State the size of the unknown angles.

$\theta° =$ $\qquad$ $\varphi° =$

b. What is the relationship between θ and φ?

---

27. Calculate the following probabilities using the two-way table below.

	C	C'	Total
D	7	13	20
D'	15	2	17
Total	22	15	37

a. P(D)=

b. P(not C)=

28. Calculate the following probabilities using the Venn diagram below.

C $\qquad$ D

2 6 4

4

a. P(C)=

b. P(C or D or both)=

29. ✎ Calculate the following statistics for the below data set

$$9, 2, 4, 4, 3, 3, 4, 1$$

a. median =

b. mean to 1 dp. $\approx$

c. mode =

d. range =

Step 3: ★ Complete the challenge questions below with your best effort

★ You may use a calculator on questions 30-32 unless otherwise stated

30. ✎ Sharon bought 3 muffins and 4 bread rolls at the bakery. The muffins cost \$2.80 each and the rolls cost 80c each. How much did Sharon's purchase cost?	31. ⊞ ✎ Calculate $(10-1)^2$ **A.** 4.5 **B.** 9 **C.** 18 **D.** 81	32. ⊞ ✎ \$300 is shared in the ratio 1:5. What fraction of the total amount is the smallest share? **A.** $\frac{1}{4}$ **B.** $\frac{1}{5}$ **C.** $\frac{1}{6}$ **D.** $\frac{2}{5}$

33. Calculate $(-5)^2$

34. Find the value of x that makes the following equation true.

$$8 : 10 = 5 : x$$

35. ✎ The points below satisfy a linear relationship. Complete the rule below.

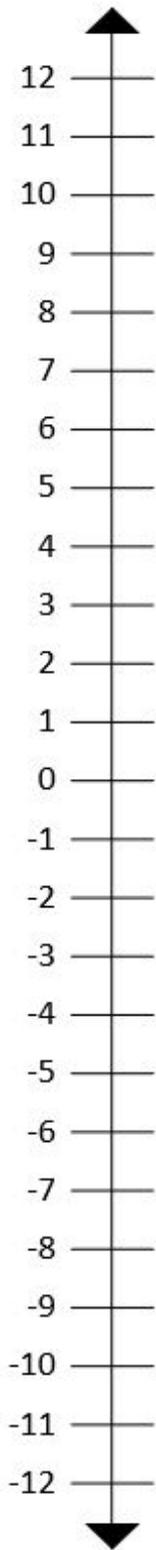| x	-1	0	1	2	3
y		2		-3	

$$y =$$

36. ✎ Determine the exact value of the radius of a circle which has an circumference of 49.5cm.

37. ✎ The 23rd term of an arithmetic sequence is 99 and the 28th term is 119. What are the first three terms of this sequence?

38. ✎ What is the final digit of 2^2000?

Number Line

```
 12 ─┤
 11 ─┤
 10 ─┤
  9 ─┤
  8 ─┤
  7 ─┤
  6 ─┤
  5 ─┤
  4 ─┤
  3 ─┤
  2 ─┤
  1 ─┤
  0 ─┤
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-10 ─┤
-11 ─┤
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MULTIPLICATION GRID

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5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
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8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

PRIME NUMBERS

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81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

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