KEY SKILLS TRAINING LEVEL 1

mathsquad

-skill development-

Contents

I number bonds

Questions Part 1 of 3 – Number bonds of 5

1a What number needs to go in each box to make the equation true?

a. $2 + \square = 5$ b. $\square + 1 = 5$ c. $\square + 2 = 5$ d. $3 + \square = 5$

e. $\square + 0 = 5$ f. $1 + \square = 5$ g. $4 + \square = 5$ h. $\square + 5 = 5$

i. $\square + 4 = 5$ j. $\square + 3 = 5$ k. $5 + \square = 5$ l. $0 + \square = 5$

Answers

a. 3 b. 4 c. 3 d. 2 e. 5 f. 4 g. 3 h. 0 i. 1 j. 2 k. 0 l. 5

Example

Question: $2 + \square = 5$

Thought process: How many more do I need to add to 2 to make 5. Using a counting on strategy, start at 2, count on 3, 4, 5. Need to count on 3 to get to 5.

Answer: 3

Questions Part 2 of 3 – Number bonds of 10

1b What number needs to go in each box to make 10?

m. $8 + \square = 10$ n. $\square + 7 = 10$ o. $\square + 1 = 10$ p. $5 + \square = 10$

q. $\square + 2 = 10$ r. $4 + \square = 10$ s. $6 + \square = 10$ t. $\square + 8 = 10$

u. $\square + 4 = 10$ v. $\square + 5 = 10$ w. $7 + \square = 10$ x. $9 + \square = 10$

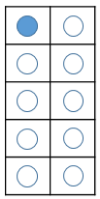
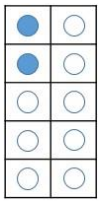
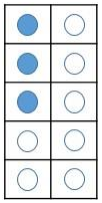
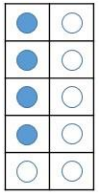
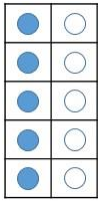
y. $1 + \square = 10$ z. $\square + 3 = 10$ aa. $\square + 6 = 10$ bb. $2 + \square = 10$

Answers

a. 2 b. 3 c. 9 d. 5 e. 8 f. 6 g. 4 h. 2 i. 6 j. 5 k. 3 l. 1 m. 9 n. 7 o. 4 p. 8

Helpful Information

Friends of 10 is a name given to pairs of numbers that make 10. These are shown in the pictures below.

				
1 + 9 = 10 9 + 1 = 10	2 + 8 = 10 8 + 2 = 10	3 + 7 = 10 7 + 3 = 10	6 + 4 = 10 4 + 6 = 10	5 + 5 = 10

Example

Question: $\square + 8 = 10$

Thought process: How many more do I need to add to 8 to make 10. Using the counting on strategy, start at 8, count on 9, 10. Need to count on 2 to get to 10.

Answer: 2

Questions Part 3 of 3 – Number bonds up to 10

1c What number needs to go in each box to make the equation true?

a. $\square + 3 = 7$	b. $3 + \square = 7$	c. $\square + 6 = 9$	d. $4 + \square = 5$
e. $1 + \square = 6$	f. $\square + 5 = 6$	g. $6 + \square = 8$	h. $\square + 2 = 4$
i. $\square + 4 = 6$	j. $3 + \square = 8$	k. $\square + 2 = 8$	l. $\square + 2 = 5$
m. $\square + 3 = 5$	n. $\square + 1 = 4$	o. $3 + \square = 4$	p. $1 + \square = 6$

Answers

a. 4 b. 4 c. 3 d. 1 e. 5 f. 1 g. 2 h. 2 i. 2 j. 5 k. 6 l. 3 m. 2 n. 3 o. 1 p. 5.

Helpful Information

Larger numbers can be broken into smaller numbers. For example, 7 can be written as 1+6, 2+5, 3+4, 4+3, 5+2 and 6+1.

Example

Question: $\square + 3 = 7$

Thought process: How many more do I need to add to 3 to make 7. Using the counting on strategy, start at 3, count on 4, 5, 6, 7. Need to count on 4 to get to 10

Answer: 4

2 mental addition

Questions – Part 1 of 4 - Adding Two Numbers Up to 10

2a Calculate the following additions

a. $2+6$	b. $1+3$	c. $6+3$	d. $0+7$
e. $5+3$	f. $0+8$	g. $3+6$	h. $2+1$
i. $1+9$	j. $6+2$	k. $6+2$	l. $4+1$
m. $4+6$	n. $4+4$	o. $7+3$	p. $1+1$
q. $3+5$	r. $2+8$	s. $0+9$	t. $3+3$

Answers

a. 8 b. 4 c. 9 d. 7 e. 8 f. 8 g. 9 h. 3 i. 10 j. 8 k. 8 l. 5 m. 10 n. 8 o. 10 p. 2 q. 8 r. 10 s. 9 t. 6

Helpful Information

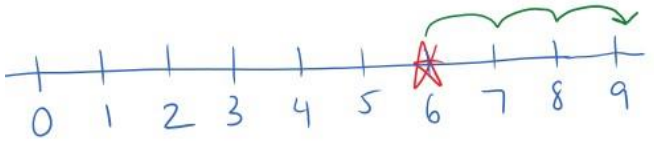
Addition is the process of finding the total value of two or more numbers.

Strategy: Counting on is a process where you start with one number then count on by another. Starting with the larger number is faster as the smaller your count on number, the quicker you'll reach the answer.

Example

Question: 3+6

Thought process: Using the above strategy, start at 6 and count on by 3. Start: 6, Count on: 7, 8, 9



Answer: 9

Questions Part 2 of 4 - Adding Two 1-digit Numbers

2b Calculate the following additions.

a. $4+9$	b. $6+8$	c. $7+7$	d. $4+8$
e. $8+7$	f. $3+9$	g. $4+9$	h. $8+5$
i. $7+5$	j. $7+4$	k. $6+7$	l. $7+8$
m. $3+9$	n. $7+6$	o. $9+2$	p. $9+4$
q. $8+6$	r. $2+9$	s. $8+9$	t. $9+9$

Answers

a. 13 b. 14 c. 14 d. 12 e. 15 f. 12 g. 13 h. 13 i. 12 j. 11 k. 13 l. 15 m. 12 n. 13 o. 11 p. 13 q. 14 r. 11 s. 17 t. 18

Helpful Information

Strategy – Building to 10

1. Start with the bigger number
2. Work out how far away from 10 it is
3. Break down the smaller number so you can build to 10
4. Then add on the left over part

Examples

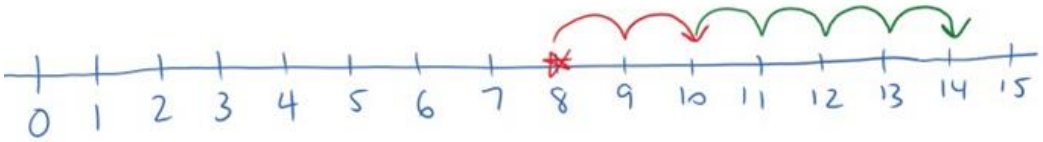
Question: 9+4

Thought process: Using the above strategy, start with 9 and notice that you are 1 away from 10. Instead of calculating 9+4 calculate 9+1+3. By building to 10 first, adding on the 3 is easy.

Answer: 13

Question: 6+8

Thought process: Using the above strategy, start with 8 and notice that you are 2 away from 10. Instead of calculating 6+8 calculate 8+2+4. By building to 10 first, adding on the 4 is easy.



Answer: 14

Questions – Part 3 of 4 – Adding a 1-digit Number to a 2-digit Number

2c Calculate the following additions.

a. $8 + 27$	b. $7 + 37$	c. $68 + 8$	d. $6 + 15$
e. $43 + 8$	f. $3 + 19$	g. $7 + 45$	h. $75 + 7$
i. $9 + 76$	j. $4 + 38$	k. $58 + 4$	l. $67 + 5$
m. $69 + 7$	n. $83 + 8$	o. $9 + 53$	p. $56 + 9$
q. $23 + 8$	r. $4 + 77$	s. $9 + 34$	t. $8 + 23$

Answers

a. 35 b. 44 c. 76 d. 21 e. 51 f. 22 g. 52 h. 82 i. 85 j. 42 k. 62 l. 72 m. 76 n. 91 o. 62 p. 65 q. 31 r. 81 s. 43 t. 31

Helpful Information

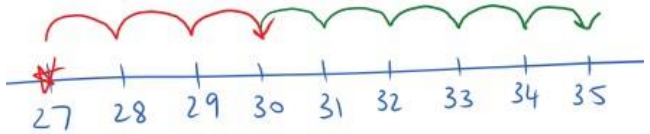
Strategy – Build to a multiple of 10

1. Start with the bigger number
2. Work out how far off a multiple of 10 it is
3. Break down the smaller number so you can build to the multiple 10
4. Then add on the left over part

Example

Question: 8+27

Thought process: Start with 27 and notice that you are 3 away from 30. Instead of calculating 27+8 calculate 27+3+5. By building to a multiple of 10 first adding on the 5 is easy.



Answer: 35

Questions – Part 4 of 4 – Adding any Two 2-digit Numbers

2d Calculate the following additions.

a. $27 + 48$	b. $56 + 25$	c. $57 + 29$	d. $48 + 46$
e. $40 + 14$	f. $36 + 16$	g. $15 + 43$	h. $79 + 18$
i. $14 + 86$	j. $50 + 41$	k. $18 + 69$	l. $15 + 41$
m. $50 + 41$	n. $45 + 30$	o. $45 + 37$	p. $16 + 76$

Answers

a. 75 b. 81 c. 86 d. 94 e. 54 f. 52 g. 58 h. 97 i. 100 j. 91 k. 87 l. 56 m. 91 n. 75 o. 82 p. 92

Helpful Information

Strategy 1 – Breaking down numbers by place value

1. Add the tens
2. Add the ones
3. Combine the totals

Strategy 2 – Building up by place value

1. Start with the first number and add on the tens of the second number
2. Add on the ones from the second number (using a build to 10 type strategy from 3c)

Strategy 3 – Compensation

1. Choose the number which is closest to a multiple of 10, round it up to the nearest multiple of 10
2. Add this on to the other number
3. Take away the amount you rounded up by

Examples

Question: 27+48
Thought process: Using strategy 1…

1. 20+40=60
2. 7+8=15
3. 60+15=75

Answer: 75

Question: 56+25
Thought process: Using strategy 2…

1. 56+20=76
2. 76+5=76+4+1=81

Answer: 81

Question: 57+29
Thought process: Using strategy 3…

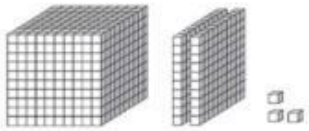
1. 29 rounds up by 1 to 30
2. 57+30=87
3. 87-1=86

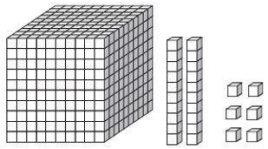
Answer: 86

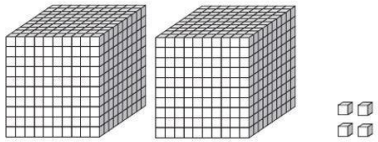
3 place value

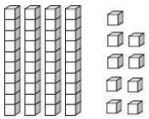
Questions Part 1 of 3 – Base 10 blocks using digits

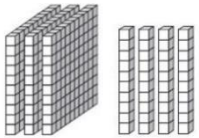
3.1 What number is shown by the blocks in each question? Write your answer using digits.

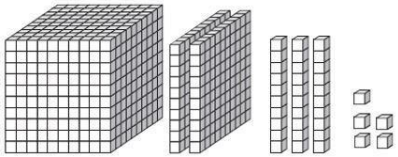
a. 

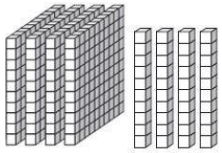
b. 

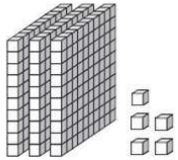
c. 

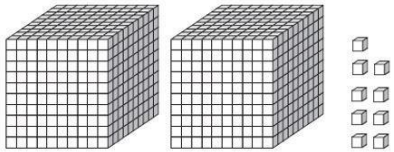
d. 

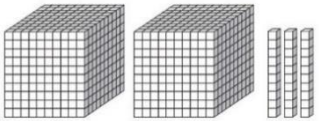
e. 

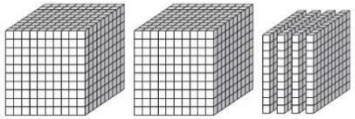
f. 

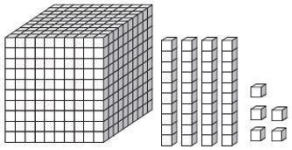
g. 

h. 

i. 

j. 

k. 

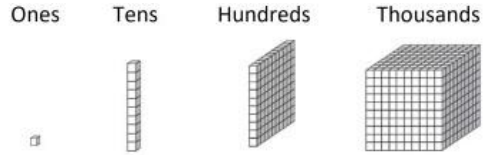
l. 

Answers

a. 1203 b. 1026 c. 2004 d. 49 e. 340 f. 1235 g. 440 h. 305 i. 2009 j. 2030 k. 2400 l. 1045

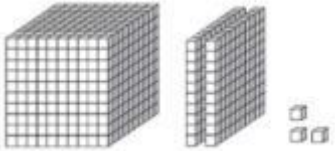
Helpful Information

The questions asked involve one or more of the following: ones, tens, hundreds and thousands.

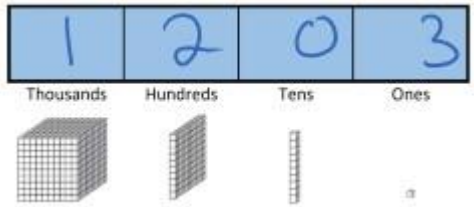


Example

Question: What number is shown by the blocks below?



Thought process: Count up the ones, then count up the tens, then the hundreds and then the thousands.



Answer: 1203

Questions – Part 2 of 3 – Writing numbers with words

3.2 Write out each of the numbers below in words.

a. 3562	b. 4080	c. 302	d. 6300	e. 68
f. 4003	g. 373	h. 25	i. 6402	j. 730
k. 1628	l. 4031	m. 241	n. 607	o. 500
p. 1003	q. 5806	r. 480	s. 4083	t. 56

Answers

a. three thousand, five hundred and sixty two b. four thousand and eighty c. three hundred and two
d. six thousand, three hundred e. sixty eight f. four thousand and three g. three hundred and seventy three
h. twenty five i. six thousand, four hundred and two j. seven hundred and thirty
k. one thousand, six hundred and twenty eight l. four thousand and thirty one m. two hundred and forty one
n. six hundred and seven o. five hundred p. one thousand and three q. five thousand, eight hundred and six
r. four hundred and eighty s. four thousand and eighty three t. fifty six

Helpful Information

Numbers written with words		
0 - zero	10 - ten	20 - twenty
1 - one	11 - eleven	30 - thirty
2 - two	12 - twelve	40 - forty
3 - three	13 - thirteen	50 - fifty
4 - four	14 - fourteen	60 - sixty
5 - five	15 - fifteen	70 - seventy
6 - six	16 - sixteen	80 - eighty
7 - seven	17 - seventeen	90 - ninety
8 - eight	18 - eighteen	
9 - nine	19 - nineteen	
Bigger Numbers		
100 - one hundred	1000 - one thousand	

Examples

Question: Write 3562 using words
Thought process: Read the number aloud and write down what you say.
Answer: three thousand, five hundred and sixty two

Question: Write 4080 using words
Thought process: Read the number aloud and write down what you say.
Answer: four thousand and eighty

Questions – Part 3 of 3 – Base 10 blocks using words

3.3 Write the numbers represented by the base ten blocks in question 3.1 using words.

Answers

a. one thousand, two hundred and three b. one thousand and twenty six c. two thousand and four
d. forty nine e. three hundred and forty f. one thousand, two hundred and thirty five
g. four hundred and forty h. three hundred and five i. two thousand and nine j. two thousand and thirty
k. two thousand, four hundred l. one thousand and forty five

4 the addition algorithm

Questions – Part 1 of 2 – Addition algorithm without carrying

4.1 Calculate the following additions. Note that the expected detail in your working is demonstrated in the examples on the right.

a. $1512 + 384$	b. $662 + 2036$	c. $1866 + 2011$	d. $468 + 3010$
e. $2093 + 902$	f. $1290 + 104$	g. $1608 + 151$	h. $622 + 2052$
i. $2210 + 575$	j. $1261 + 1007$	k. $2498 + 500$	l. $419 + 3030$
m. $3423 + 3053$	n. $1658 + 2011$	o. $1853 + 104$	p. $1203 + 2094$
q. $631 + 3034$	r. $3151 + 232$	s. $2304 + 632$	t. $1217 + 3002$

Answers

a. 1896 b. 2698 c. 3877 d. 3478 e. 2995 f. 1394 g. 1759 h. 2674 i. 2785 j. 2268 k. 2998 l. 3449 m. 6476 n. 3669 o. 1957 p. 3297 q. 3665 r. 3383 s. 2936 t. 4219

Helpful Information

An **algorithm** is an efficient step by step approach for doing something (usually involving calculations).

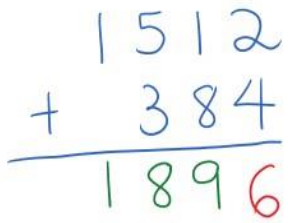
Strategy for addition algorithm without carrying

1. Write the numbers on top of each other so digits with the same place value are lined up. Draw a plus sign on the left and a horizontal line under the sum
2. Start by adding the digits in the ones column and writing the answer directly underneath
3. Add the tens digits and write the answer directly underneath the tens column
4. Continue in this way with the hundreds, then the thousands etc

Examples

Question: 1512+384

Working out: Using the above strategy…



Answer: 1896

Questions – Part 2 of 2 – Addition algorithm with carrying

4.2 Calculate the following additions

a. $456 + 2072$	b. $9367 + 2459$	c. $3367 + 3073$	d. $785 + 2062$
e. $355 + 1074$	f. $2427 + 2059$	g. $3151 + 1071$	h. $634 + 2084$
i. $2361 + 1068$	j. $184 + 2056$	k. $2741 + 591$	l. $481 + 3054$
m. $1521 + 397$	n. $2784 + 268$	o. $3271 + 1051$	p. $3684 + 737$
q. $1193 + 397$	r. $1472 + 1042$	s. $3146 + 785$	t. $1177 + 654$

Answers

a. 2528 b. 11826 c. 6440 d. 2847 e. 1429 f. 4486 g. 4222 h. 2718 i. 3429 j. 2240 k. 3332 l. 3535 m. 1918 n. 3052 o. 4322 p. 4421 q. 1590 r. 2514 s. 3931 t. 1831

Helpful Information

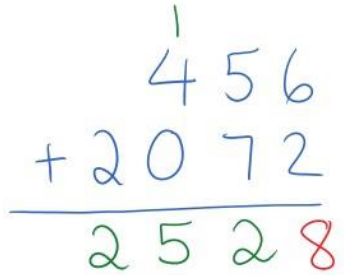
Strategy for addition algorithm with carrying

1. Write the numbers on top of each other so digits with the same place value are lined up. Draw a plus sign on the left and a horizontal line under the sum
2. Start by adding the ones digits
    a. If the answer is less than 10 write the answer directly underneath the ones column
    b. If the answer is greater than 10, write the ones value of the answer directly underneath the ones column and "carry" the tens value on top of the tens column
3. Continue in this way with the tens, then hundreds, then the thousands etc, when carrying, carry into the next highest column

Examples

Question: 456+2072

Working out: Using the above strategy…



Answer: 2528

5 mental subtraction

Questions – Part 1 of 4 - Subtraction of two numbers 10 or less

5a Calculate the following subtractions.

a. $6-4$	b. $8-3$	c. $4-4$	d. $10-10$
e. $5-3$	f. $8-1$	g. $5-4$	h. $10-3$
i. $8-5$	j. $9-2$	k. $10-2$	l. $9-1$
m. $10-4$	n. $8-6$	o. $7-5$	p. $10-1$
q. $4-2$	r. $3-1$	s. $9-1$	t. $7-2$

Answers

a. 2 b. 5 c. 0 d. 0 e. 2 f. 7 g. 1 h. 7 i. 3 j. 7 k. 8 l. 8 m. 6 n. 2 o. 2 p. 9 q. 2 r. 2 s. 8 t. 5

Helpful Information

Subtraction is the process of taking one number away from another or finding the difference between two numbers. Subtraction is the **opposite operation** of addition.

Strategy 1 – Counting Back

Start with the first number then count back by the second. This is a good strategy when the number you are taking away is small.

Strategy 2 – Counting up (finding the difference)

Start with the second number and count up to see how far away it is from the first. This is a good strategy when the numbers are close together.

Examples

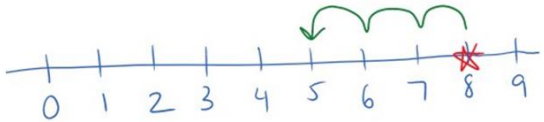
Question: 6-4

Thought process: As the numbers are close together strategy 2 is a good option. Starting at 4, we have to count up 5, 6 to get to 6. This means the difference between 4 and 6 is 2.

Answer: 2

Question: 8-3

Thought process: As we are subtracting a small number strategy 1 is a good option. Starting at 8 we count back by three, 7, 6, 5.



Answer: 5

Questions – Part 2 of 4 - Subtracting a 1-digit number from a 2-digit number

5b Calculate the following subtractions.

a. $13-6$	b. $14-8$	c. $11-6$	d. $15-6$
e. $14-9$	f. $15-7$	g. $12-8$	h. $12-6$
i. $11-7$	j. $12-4$	k. $12-5$	l. $13-6$
m. $15-7$	n. $12-7$	o. $11-4$	p. $11-8$

Answers

a. 7 b. 6 c. 5 d. 9 e. 5 f. 8 g. 4 h. 6 i. 4 j. 8 k. 7 l. 7 m. 8 n. 5 o. 7 p. 3

Helpful Information

Strategy 1 – Take away to 10

1. Start with the first number and work out how far away it is from 10
2. Break down the second number so you can take away to 10
3. Then take away the left over part

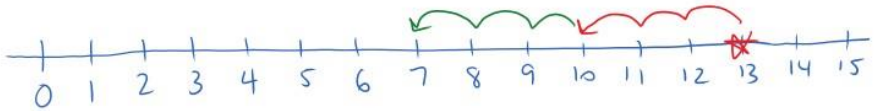
Strategy 2 – Counting up (find the difference)

1. Start with the second number
2. Count up to see how far away it is from the first number. Building up to 10 and then continuing to count up to the first number is often easiest to do

Examples

Question: 13-6

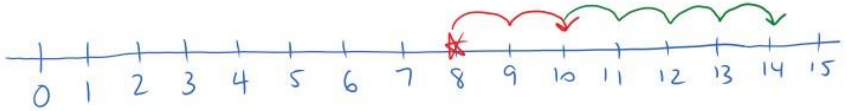
Thought process: Using strategy 1 we would start at 13 and take 3 away to make 10. As 6 is made up of 3+3 we need to take 3 more away so we arrive at 7.



Answer: 7

Question: 14-8

Thought process: Using strategy 2 we start at 8 and count up by 2 to get to 10. We need to count up 4 more to get to 14. So altogether the difference between 8 and 14 is 6.



Answer: 6

Questions – Part 3 of 4 - Subtracting numbers using take away and difference

5c Calculate the following subtractions.

a. $91-85$	b. $91-7$	c. $54-47$	d. $32-6$
e. $71-7$	f. $33-26$	g. $33-9$	h. $74-68$
i. $84-77$	j. $75-66$	k. $32-28$	l. $91-5$
m. $52-47$	n. $41-35$	o. $24-16$	p. $71-7$
q. $51-6$	r. $93-5$	s. $53-46$	t. $81-9$

Answers

a. 6 b. 84 c. 7 d. 26 e. 64 f. 7 g. 24 h. 6 i. 7 j. 9 k. 4 l. 86 m. 5 n. 6 o. 8 p. 64 q. 45 r. 88 s. 7 t. 72

Helpful Information

Strategy 1 – Take away to a multiple of 10

This is a good strategy to use when you are taking away a single digit number.
To use this strategy

1. Start with the first number and work out how far away it is from a multiple of 10
2. Break down the second number so you can take away to the multiple of 10
3. Then take away the left over part

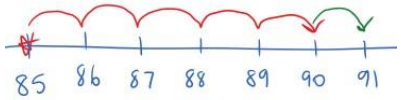
Strategy 2 – Counting up (find the difference)

This is a good strategy when the numbers you are subtracting are close together.
To use this strategy

1. Count up to see how far away it is from the first number.
2. Building up to 10 and then continuing to count up to the first number is often easiest to do

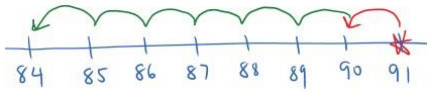
Examples

Question: 91-85
Thought process: Since the numbers are close together strategy 2 is a good option. We start at 85 and count up by 5 to get to 90. We need to count up 1 more to get to 91. So altogether the difference between 85 and 91 is 6.



Answer: 6

Question: 91-7
Thought process: As we are taking away a single digit, strategy 1 is a good option. We start at 91 and take 1 away to make 90. As 7 is made up of 1+6 we need to take 6 more away so we arrive at 84.



Answer: 84

Questions – Part 1 of 1 – Subtracting a two 2-digit number

5d Complete the following subtractions.

a. $91 - 56$	b. $75 - 38$	c. $66 - 12$	d. $55 - 29$
e. $43 - 30$	f. $63 - 43$	g. $84 - 20$	h. $83 - 33$
i. $84 - 44$	j. $56 - 24$	k. $84 - 30$	l. $93 - 26$
m. $50 - 34$	n. $88 - 59$	o. $49 - 24$	p. $64 - 14$

Answers

a. 35 b. 37 c. 54 d. 26 e. 13 f. 20 g. 64 h. 50 i. 40 j. 32 k. 54 l. 67 m. 16 n. 29 o. 25 p. 50

Helpful Information

Strategy 1 – Taking away by place value

1. Start with the first number and subtract the tens of the second number
2. Take away the ones of the second number (using a build to 10 type strategy from 5c)

Strategy 2 – Building up (find the difference)

1. Start at the second number and build up to the nearest multiple of 10
2. Continue building up to the tens value of the first number
3. Continue building up to the value of the first number
4. Add up each of the numbers from steps 1 to 3 to find the total difference between the numbers

Examples

Question: 91-56

Thought process: Using strategy 1…

1. 91-50=41
2. 41-6=41-1-5=35

Answer: 35

Question: 75-38

Thought process: Using strategy 2…

1. 38+2=40
2. 40+30=70
3. 70+5=75
4. 2+30+5=37

Answer: 37

6 the subtraction algorithm

Questions – Part 1 of 3 – Subtraction algorithm without borrowing

6.1 Calculate the following subtractions. Note that the expected detail in your working is demonstrated in the examples on the right.

a. $3899 - 320$	b. $3239 - 1036$	c. $4835 - 3001$	d. $1199 - 1072$
e. $3893 - 1012$	f. $1697 - 1032$	g. $2976 - 222$	h. $1419 - 1001$
i. $2869 - 451$	j. $3987 - 107$	k. $4193 - 2001$	l. $3299 - 2064$
m. $2648 - 232$	n. $5189 - 2008$	o. $4659 - 1022$	p. $3985 - 881$
q. $1589 - 1000$	r. $5175 - 3060$	s. $3288 - 1064$	t. $3699 - 130$

Answers

a. 3579 b. 2203 c. 1834 d. 127 e. 2881 f. 665 g. 2754 h. 418 i. 2418 j. 3880 k. 2192 l. 1235 m. 2416 n. 3181 o. 3637 p. 3104 q. 589 r. 2115 s. 2224 t. 3569

Helpful Information

An **algorithm** is an efficient step by step approach for doing something (usually involving calculations).

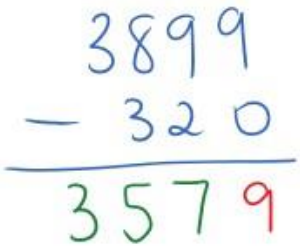
Strategy for subtraction algorithm without borrowing:

1. Write the numbers on top of each other so digits with the same place value are lined up. Draw a take away on the left and a horizontal line under the sum
2. Start by taking away the bottom ones digit from the top ones digit and writing the answer directly underneath the ones column
3. Continue in this way with the tens, then hundreds, then the thousands etc

Example

Question: 3899-320

Working out: Using the above strategy…



Answer: 3579

Questions – Part 2 of 3 – Subtraction algorithm with borrowing

6.2 Calculate the following subtractions. Note that the expected detail in your working is demonstrated in the examples on the right.

a. $1854 - 791$	b. $1341 - 527$	c. $1119 - 551$	d. $1126 - 727$
e. $883 - 357$	f. $610 - 133$	g. $720 - 374$	h. $1214 - 728$
i. $922 - 563$	j. $765 - 593$	k. $566 - 237$	l. $1450 - 799$
m. $1392 - 577$	n. $1249 - 555$	o. $810 - 685$	p. $1155 - 696$
q. $880 - 236$	r. $1154 - 467$	s. $1170 - 196$	t. $1223 - 551$

Answers

a. 1063 b. 814 c. 568 d. 399 e. 526 f. 477 g. 346 h. 486 i. 359 j. 172 k. 329 l. 651 m. 815 n. 694 o. 125 p. 459 q. 644 r. 687 s. 974 t. 672

Helpful Information

Strategy for subtraction algorithm with borrowing:

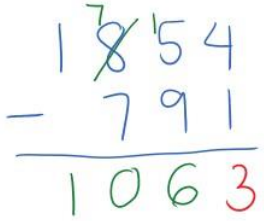
1. Write the numbers on top of each other so digits with the same place value are lined up. Draw a take away sign on the left and a horizontal line under the sum
2. Start by subtracting the bottom ones digit from the top
    a. If the bottom ones digit is smaller than the top ones digit then write the answer directly underneath the ones column
    b. If the bottom ones digit is bigger than the top ones digit then you will need to "borrow" from the tens column. This involves reducing the top tens value by 1* and then adding ten ones to the ones column, allowing you to now complete the subtraction of the bottom digit from the top number
3. Continue in this way with the tens, then hundreds, then the thousands etc.

*Note that this will not always be possible as there could be a zero in the tens place. This case is discussed separately in Part 3 of 3 below.

Example

Question: 1854-791

Working out: Using the above strategy…



Answer: 1063

Questions – Part 3 of 3 – Subtraction algorithm including some more complex cases

6.3 Calculate the following subtractions. Note that the expected detail in your working is demonstrated in the examples on the right.

a.	$1027 - 751$	b.	$1150 - 723$	c.	$1517 - 659$	d.	$936 - 743$
e.	$1101 - 622$	f.	$1649 - 764$	g.	$882 - 688$	h.	$1003 - 367$
i.	$527 - 142$	j.	$608 - 469$	k.	$1067 - 538$	l.	$1070 - 196$
m.	$1141 - 474$	n.	$800 - 685$	o.	$418 - 123$	p.	$1054 - 467$

Answers

a. 276 b. 427 c. 858 d. 193 e. 479 f. 885 g. 194 h. 636 i. 385 j. 139 k. 529 l. 874 m. 667 n. 115 o. 295 p. 587

Helpful Information

Sometimes when you go to borrow from the next place value column there is a zero there. Below are three strategies showing how you could work through a question of this type.

Strategy 1 – Borrow again

1. Go to the first non-zero place value
2. Reduce the non-zero value by 1 and rename the next place value to the right 10.
3. Reduce this 10 to a 9 and rename the next place value to the right 10.
4. Continue with this process until you have reached the place value position you were up to in the subtraction
5. Continue using the subtraction algorithm

Strategy 2 – Maintain a common difference

1. Increase the value of the place you are up to in the top number by 10
2. Increase the value of the next largest place in the bottom number by 1
3. Continue to subtract the bottom value from the top value using steps 1 and 2 as necessary

Strategy 3 – Counting up

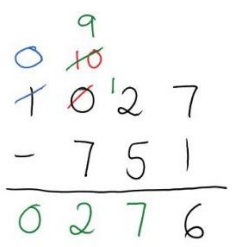
Perhaps being supported by a number line, count up from the second number to the first. It is helpful to count up to multiples of 10, 100 and 1000.

Example

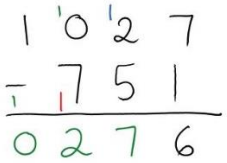
Question: 1027-751

Thought process: Below shows the use of the three above strategies:

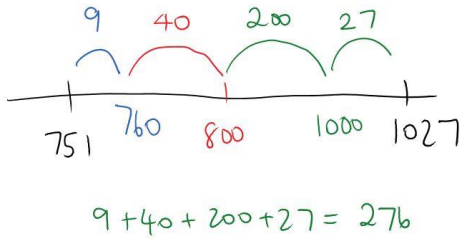
Strategy 1



Strategy 2



Strategy 3



Answer: 276

Return to contents page

7 times tables

Questions – Part 1 of 16 – Doubling numbers

7.1 Double the following numbers.

a. 38	b. 45	c. 30	d. 33
e. 36	f. 12	g. 54	h. 16
i. 32	j. 8	k. 18	l. 15
m. 48	n. 66	o. 25	p. 7
q. 9	r. 28	s. 27	t. 42

Answers

a. 76 b. 90 c. 60 d. 66 e. 72 f. 24 g. 108 h. 32 i. 64 j. 16 k. 36 l. 30 m. 96 n. 132 o. 50 p. 14 q. 18 r. 56 s. 54 t. 84

Helpful Information

Doubling is the process of adding a number to itself or the process of combining two equal groups of the number.

All strategies that were discussed in 3d can be used to add a number to itself.

Examples

Question: Double 38

Thought Process Option 1: Breaking down the number by place value we can calculate

a. 30+30=60
b. 8+8=16
c. 60+16=76

Thought Process Option 2: Building up by place value we have

a . 38+30=68
b. 68+8=68+2+6=76

Answer: 76

Questions – Part 2 of 16 – Halving numbers

7.2 Halve the following numbers.

a. 78	b. 56	c. 40	d. 108
e. 28	f. 36	g. 42	h. 12
i. 64	j. 72	k. 100	l. 60
m. 74	n. 132	o. 18	p. 120
q. 46	r. 38	s. 52	t. 44

Answers

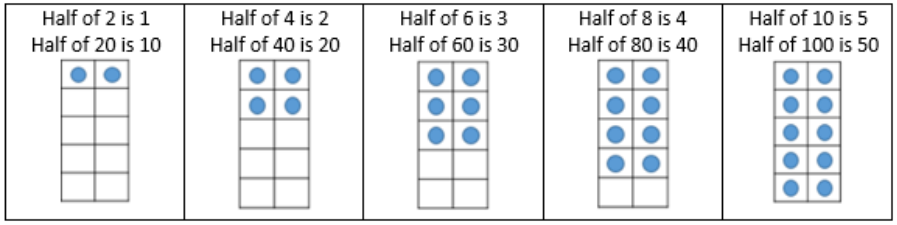
a. 39 b. 28 c. 20 d. 54 e. 14 f. 18 g. 21 h. 6 i. 32 j. 36 k. 50 l. 30 m. 37 n. 66 o. 9 p. 60 q. 23 r. 19 s. 26 t. 22

Helpful Information

Halving a number is the process of splitting the number into two equal parts. An **even** number is created from doubling another whole number.

Even numbers end in a 0, 2, 4, 6 or 8.
Whole numbers which aren't even are **odd**. Odd numbers end in 1, 3, 5, 7 or 9

Tens frames help us visualise how to halve even numbers up to 10, and even multiples of 10 too.



Halving odd multiples of 10 is a little more challenging. One strategy is to break the number down into 10 and an even multiple. Eg. To halve 50 we can halve 10 to get 5 then halve 40 to get 20. So half of 50 is 25.

Strategy: Halve the tens, halve the ones then add the two halves together.

Example

Question: Halve 78
Thought process: Half of 70 can be found by halving 10 then halving 60, giving us 5 and 30, making 35. Half of 8 is 4. So half of 78 is 35+4=39
Answer: 39

Questions – Part 3 of 16 – 1 times tables

7.3 Calculate the following multiplications.

a. 7×1	b. 1×11	c. 9×1	d. 5×1
e. 1×8	f. 6×1	g. 4×1	h. 1×2
i. 0×1	j. 1×5	k. 3×1	l. 1×1
m. 1×9	n. 1×7	o. 1×12	p. 8×1

Answers

a. 7 b. 11 c. 9 d. 5 e. 8 f. 6 g. 4 h. 2 i. 0 j. 5 k. 3 l. 1 m. 9 n. 7 o. 12 p. 8

Helpful Information

1×6 is read as "1 times 6" and is best thought of as 1 group of 6. This can be represented using the picture below.

A useful fact is that multiplication is **commutative** which means the order isn't important. For example, $1 \times 6 = 6 \times 1$. The easiest way to see this is that given a picture of 1 row of 6 stars it is possible to see them as 6 columns of 1 star as well.

Questions – Part 4 of 16 – 10 times tables

7.4 Calculate the following multiplications.

a. 0×10	b. 10×5	c. 3×10	d. 10×10
e. 7×10	f. 10×11	g. 9×10	h. 5×10
i. 10×9	j. 10×7	k. 10×12	l. 1×10
m. 10×8	n. 6×10	o. 4×10	p. 10×2

Answers

a. 0 b. 50 c. 30 d. 100 e. 70 f. 110 g. 90 h. 50 i. 90 j. 70 k. 120 l. 10 m. 80 n. 60 o. 40 p. 20

Helpful Information

Counting by 10s reveals a lovely pattern
10, 20, 30, 40, 50, 60, 70, 80,…

To multiply a number by 10 the digits move up one place value.
To multiply a whole number by 10 we just add a zero to the end of the number.

Questions – Part 5 of 16 – 2 times tables

7.5 Calculate the following multiplications.

a. 2×9	b. 2×7	c. 2×4	d. 11×2
e. 2×8	f. 6×2	g. 4×2	h. 2×1
i. 7×2	j. 2×12	k. 9×2	l. 5×2
m. 0×2	n. 2×10	o. 3×2	p. 2×2

Answers

a. 18 b. 14 c. 8 d. 22 e. 16 f. 12 g. 8 h. 2 i. 14 j. 24 k. 18 l. 10 m. 0 n. 20 o. 6 p. 4

Helpful Information

Please refer to subskill *7.1*

Questions – Part 6 of 16 – 5 times tables

7.6 Calculate the following multiplications.

a. 5×7	b. 6×5	c. 4×5	d. 5×12
e. 7×5	f. 5×8	g. 9×5	h. 5×5
i. 0×5	j. 5×10	k. 3×5	l. 2×5
m. 5×9	n. 5×11	o. 5×4	p. 1×5

Answers

a. 35 b. 30 c. 20 d. 60 e. 35 f. 40 g. 45 h. 25 i. 0 j. 50 k. 15 l. 10 m. 45 n. 55 o. 20 p. 5

Helpful Information

To calculate 5 groups of a number, calculate 10 groups then halve it.

Examples

Question: 5x7
Thought process: 10 groups of 7 is 70 so 5 groups of 7 must be 35 (half of 70)
Answer: 35

Question: 6x5
Thought process: 6x5 is the same as 5x6. 10 groups of 6 is 60 so 5 groups of 6 must be 30 (half of 60)
Answer: 30

Questions – Part 7 of 16 – 4 times tables

7.7 Calculate the following multiplications.

a. 4×7	b. 9×4	c. 4×12	d. 5×4
e. 4×8	f. 6×4	g. 4×4	h. 4×2
i. 0×4	j. 4×11	k. 3×4	l. 4×1
m. 4×9	n. 4×7	o. 4×6	p. 8×4

Answers

a. 28 b. 36 c. 48 d. 20 e. 32 f. 24 g. 16 h. 8 i. 0 j. 44 k. 12 l. 4 m. 36 n. 28 o. 24 p. 32

Helpful Information

To calculate 4 groups of a number, double the number then double it again.

Examples

Question: 4x7
Thought process: 7 doubled is 14 (2x7=14), and double 14 is 28
Answer: 28

Question: 9x4
Thought process: 9x4 has the same value as 4x9. 9 doubled is 18 (2x9=18), and double 18 is 36
Answer: 36

Questions – Part 8 of 16 – 8 times tables

7.8 Calculate the following multiplications.

a. 8×6	b. 9×8	c. 8×12	d. 8×10
e. 7×8	f. 8×3	g. 11×8	h. 5×8
i. 8×9	j. 8×7	k. 8×4	l. 1×8
m. 8×8	n. 0×8	o. 4×8	p. 8×2

Answers

a. 48 b. 72 c. 96 d. 80 e. 56 f. 24 g. 88 h. 40 i. 72 j. 56 k. 32 l. 8 m. 64 n. 0 o. 32 p. 16

Helpful Information

8 groups of a number can be calculated by calculating double 4 groups of the number.

Examples

Question: 8x6
Thought process: Since 4x6=24, we just double 24 to get 48
Answer: 48

Question: 9x8
Thought process: 9x8 has the same value as 8x9. Since 4x9=36, we just double 36 to get 72
Answer: 72

Questions – Part 9 of 16 – 9 times tables

7.9 Calculate the following multiplications.

a. 9×6	b. 7×9	c. 9×11	d. 1×9
e. 9×8	f. 9×9	g. 4×9	h. 9×1
i. 7×9	j. 9×12	k. 8×9	l. 5×9
m. 0×9	n. 9×10	o. 3×9	p. 2×9

Answers

a. 54 b. 63 c. 99 d. 9 e. 72 f. 81 g. 36 h. 9 i. 63 j. 108 k. 72 l. 45 m. 0 n. 90 o. 27 p. 18

Helpful Information

To calculate 9 groups of a number, calculate 10 groups then take one group away.

Examples

Question: 9x6
Thought process: 10 groups of 6 is 60 so 9 groups of 6 must be 60-6=54
Answer: 54

Question: 7x9
Thought process: 7x9 is the same as 9x7. 10 groups of 7 is 70 so 9 groups of 7 must be 70-7=63
Answer: 63

Questions – Part 10 of 16 – 11 times tables

7.10 Calculate the following multiplications.

a. 11×7	b. 12×11	c. 5×11	d. 11×2
e. 7×11	f. 11×8	g. 9×11	h. 11×11
i. 0×11	j. 11×10	k. 3×11	l. 2×11
m. 11×9	n. 6×12	o. 11×4	p. 1×11

Answers

a. 77 b. 132 c. 55 d. 22 e. 77 f. 88 g. 99 h. 121 i. 0 j. 110 k. 33 l. 22 m. 99 n. 66 o. 44 p. 11

Helpful Information

To calculate 11 groups of a number, calculate 10 groups then add one more group.

Examples

Question: 11x7
Thought process: 10 groups of 7 is 70 so 11 groups of 7 must be 70+7=77
Answer: 77

Question: 12x11
Thought process: 12x11 is the same as 11x12. 10 groups of 12 is 120 so 11 groups of 12 must be 120+12=132
Answer: 132

Questions – Part 11 of 16 – 4, 8, 9 and 11 times tables

7.11 Calculate the following multiplications.

a. 11×7	b. 6×4	c. 9×8	d. 8×7
e. 8×9	f. 4×12	g. 7×4	h. 9×7
i. 9×0	j. 6×8	k. 11×4	l. 9×4
m. 6×9	n. 4×4	o. 9×9	p. 8×12

Answers

a. 77 b. 24 c. 72 d. 56 e. 72 f. 48 g. 28 h. 63 i. 0 j. 48 k. 44 l. 36 m. 54 n. 16 o. 81 p. 96

Questions – Part 12 of 16 – 3 times tables

7.12 Calculate the following multiplications.

a. 3×8	b. 12×3	c. 9×3	d. 5×3
e. 7×3	f. 6×3	g. 3×3	h. 3×2
i. 0×3	j. 3×11	k. 3×4	l. 3×1
m. 3×9	n. 3×7	o. 3×6	p. 8×3

Answers

a. 24 b. 36 c. 27 d. 15 e. 21 f. 18 g. 9 h. 6 i. 0 j. 33 k. 12 l. 3 m. 27 n. 21 o. 18 p. 24

Helpful Information

To calculate 3 groups of a number, double the number then add one more group.

Examples

Question: 3x8
Thought process: 8 doubled is 16, and 16+8=24
Answer: 24

Question: 12x3
Thought process: 12x3 has the same value as 3x12. 12 doubled is 24 and 24+12=36
Answer: 36

Questions – Part 13 of 16 – 6 times tables

7.13 Calculate the following multiplications.

a. 6×8	b. 12×6	c. 6×11	d. 6×10
e. 7×6	f. 6×3	g. 9×6	h. 5×6
i. 6×9	j. 6×7	k. 6×4	l. 1×6
m. 0×6	n. 6×6	o. 4×6	p. 6×2

Answers

a. 48 b. 72 c. 66 d. 60 e. 42 f. 18 g. 54 h. 30 i. 54 j. 42 k. 24 l. 6 m. 0 n. 36 o. 24 p. 12

Helpful Information

.

6 groups of a number can be calculated by calculating double 3 groups of the number

Examples

Question: 6x8
Thought process: Since 3x8=24, we just double 24 to get 48
Answer: 48

Question: 12x6
Thought process: 12x6 has the same value as 6x12. 3x12=36, we just double 36 to get 72.
Answer: 72

Questions – Part 14 of 16 – 12 times tables

7.14 Calculate the following multiplications.

a. 12×6	b. 7×12	c. 12×11	d. 1×12
e. 12×8	f. 12×12	g. 4×12	h. 12×1
i. 12×7	j. 9×12	k. 8×12	l. 5×12
m. 0×12	n. 12×10	o. 3×12	p. 2×12

Answers

a. 72 b. 84 c. 132 d. 12 e. 96 f. 144 g. 48 h. 12 i. 84 j. 108 k. 96 l. 60 m. 0
n. 120 o. 36 p. 24

Helpful Information

To calculate 12 groups of a number, calculate 10 groups then add two more groups.

Examples

Question: 12x6
Thought process: 10 groups of 6 is 60 so 12 groups of 6 is 60+12=72
Answer: 72

Question: 7x12
Thought process: 7x12 is the same as 12x7. 10 groups of 7 is 70 so 12 groups of 7 must be 70+14=84
Answer: 84

Questions – Part 15 of 16 – 7 times tables

7.15 Calculate the following multiplications.

a. 7×7	b. 8×7	c. 5×7	d. 7×2
e. 7×11	f. 6×7	g. 9×7	h. 7×12
i. 0×7	j. 7×10	k. 3×7	l. 2×7
m. 7×9	n. 7×6	o. 7×4	p. 1×7

Answers

a. 49 b. 56 c. 35 d. 14 e. 77 f. 42 g. 63 h. 84 i. 0 j. 70 k. 21 l. 14 m. 63 n. 42 o. 28 p. 7

Helpful Information

To calculate 7 groups of a number, calculate 5 groups then add two more groups.

Examples

Question: 7x7
Thought process: 5x7=35 so 7x7=35+14=49
Answer: 49

Question: 8x7
Thought process: 8x7 is the same as 7x8. 5x8=40 so 7x8=40+16=56
Answer: 56

Questions – Part 16 of 16 – 3, 6, 12 and 7 times tables

7.16 Calculate the following multiplications

a. 8×12	b. 4×6	c. 7×4	d. 9×3
e. 3×0	f. 6×7	g. 12×4	h. 3×4
i. 6×3	j. 6×4	k. 7×6	l. 7×7
m. 0×12	n. 8×12	o. 8×6	p. 12×9

Answers

a. 96 b. 24 c. 28 d. 27 e. 0 f. 42 g. 48 h. 12 i. 18 j. 24 k. 42 l. 49 m. 0 n. 96 o. 48 p. 108

8 the multiplication algorithm

Questions – Part 1 of 1 – Standard Algorithm for 1 digit by 3 digits

8.1 Calculate the following multiplications. Note that the expected detail in your working is demonstrated in the examples on the right.

a. 6×971	b. 9×182	c. 646×7	d. 9×215
e. 258×8	f. 623×6	g. 8×187	h. 391×3
i. 993×5	j. 464×7	k. 7×664	l. 3×799
m. 794×4	n. 6×177	o. 3×798	p. 883×6

Answers

a. 5826 b. 1638 c. 4522 d. 1935 e. 2064 f. 3738 g. 1496 h. 1173 i. 4965 j. 3248 k. 4648 l. 910 m. 3176 n. 1029 o. 2394 p. 5298

Helpful Information

Strategy:

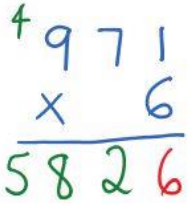
1. Write the biggest number on top of the smallest number, so digits with the same place value are lined up. Draw a multiplication sign on the left and a horizontal line under the sum
2. Start by multiplying the bottom ones digit and the top ones digit
    a. If the answer is less than 10 write the answer directly underneath the ones column
    b. If the answer is greater than 10, write the ones value of the answer directly underneath the ones column and "carry" the tens value on top of the tens column
3. Keep multiplying the bottom ones digit by every other digit in the top number (after ones do tens, then hundreds etc). If a number has been "carried" you will need to add this on **after** you've done the multiplication.

Example

Question: 6x971

Thought process: Using the above strategy (see to the right)

Answer: 5826



9 division facts

Questions – Part 1 of 4 – Completing multiplication facts

9a-c.1 Fill in the boxes to make the equations true.

a. $\square \times 3 = 36$	b. $\square \times 7 = 21$	c. $9 \times \square = 27$	d. $\square \times 6 = 24$
e. $\square \times 7 = 56$	f. $2 \times \square = 12$	g. $\square \times 8 = 32$	h. $9 \times \square = 108$
i. $6 \times \square = 72$	j. $\square \times 4 = 36$	k. $7 \times \square = 35$	l. $6 \times \square = 18$
m. $4 \times \square = 48$	n. $8 \times \square = 64$	o. $\square \times 8 = 32$	p. $\square \times 7 = 0$

Answers

a. 12 b. 3 c. 3 d. 4 e. 8 f. 6 g. 4 h. 12 i. 12 j. 9 k. 5 l. 3 m. 12 n. 8 o. 4 p. 0

Questions – Part 2 of 4 – Division facts

9a-c.2 Calculate the following divisions.

a. $24 \div 3$	b. $10 \div 5$	c. $8 \div 4$	d. $12 \div 4$
e. $21 \div 3$	f. $10 \div 2$	g. $64 \div 8$	h. $24 \div 6$
i. $63 \div 9$	j. $27 \div 9$	k. $132 \div 11$	l. $45 \div 9$
m. $35 \div 7$	n. $48 \div 6$	o. $35 \div 5$	p. $96 \div 12$
q. $49 \div 7$	r. $80 \div 10$	s. $32 \div 8$	t. $28 \div 7$

Answers

a. 8 b. 2 c. 2 d. 3 e. 7 f. 5 g. 8 h. 4 i. 7 j. 3 k.12 l.5 m. 5 n. 8 o. 7 p. 8 q. 7 r. 8 s. 4 t. 4

Helpful Information

$12 \div 3$ is read as "12 divided by 3" and can be thought of in two ways.

"12 how many groups of 3?" Or similarly, "How many groups of 3 make 12"	"12 shared equally between three groups, how many in each group?"
	

Examples

Question: 24÷3

Thought process option 1: How many groups of 3 make up 24? Since 8x3=24, that is "8 groups of 3 make 24", the answer must be 8

Thought process option 2: Sharing 24 equally between 3 groups. Since 3x8=24, that is "3 groups of 8 make 24", the answer must be 8

Answer: 8

Questions Part 3 of 4 – Equal Sharing

9d.3 Do the following divisions share equally using whole numbers?

a. $14 \div 2$	b. $14 \div 5$	c. $24 \div 11$	d. $103 \div 11$
e. $41 \div 5$	f. $10 \div 8$	g. $4 \div 7$	h. $3 \div 3$
i. $36 \div 9$	j. $86 \div 7$	k. $50 \div 5$	l. $12 \div 12$
m. $2 \div 4$	n. $28 \div 4$	o. $99 \div 9$	p. $5 \div 1$

Answers

a. yes b. no c. no d. no e. no f. no g. no h. yes i. yes j. no k. yes l. yes m. no n. yes o. yes p. yes

Helpful Information

So far, all division questions have been able to be answered by equally sharing the total without any left overs. This new skill involves divisions that cannot be shared equally using whole numbers. Below are some examples of divisions that do and don't share equally (using whole numbers).

$12 \div 3$	$13 \div 3$	$14 \div 3$	$15 \div 3$
			
Shares equally	Doesn't share equally	Doesn't share equally	Shares equally

Examples

Question: Does the division $14 \div 2$ share equally using whole numbers?
Thought process: $14 \div 2 = 7$, when 14 is shared equally into 2 groups, there are 7 in each group.
Answer: Yes

Question: Does the division $14 \div 5$ share equally using whole numbers?
Thought process: When 14 is shared equally into 5 groups, there are 2 in each group and 4 left over.
Answer: No

Questions Part 4 of 4 – Divisions with remainders

9d.4 Calculate the following and give your answer in the form ☐ rem. ☐

a. $14 \div 3$	b. $69 \div 6$	c. $3 \div 7$	d. $3 \div 2$
e. $15 \div 11$	f. $16 \div 9$	g. $66 \div 7$	h. $99 \div 10$
i. $139 \div 11$	j. $75 \div 7$	k. $5 \div 4$	l. $4 \div 5$
m. $19 \div 2$	n. $12 \div 7$	o. $7 \div 12$	p. $41 \div 9$

Answers

a. 4 rem. 2 b. 11 rem. 3 c. 0 rem. 3 d. 1 rem. 1 e. 1 rem. 4 f. 1 rem. 7 g. 9 rem. 3 h. 9 rem. 9 i. 12 rem. 7 j. 10 rem. 5 k. 1 rem. 1 l. 0 rem. 4 m. 9 rem. 1 n. 1 rem. 5 o. 0 rem. 7 p. 4 rem. 5

Helpful Information

In a division question where we cannot do an equal sharing using whole numbers, the amount left over is called the **remainder**. The remainder is always less than the number we are dividing by. If you accidently get a remainder bigger than this it means each group can be at least 1 bigger!

Example

Question: Calculate $14 \div 3$ and give your answer in the form ☐ rem. ☐
Thought process: $12 \div 3 = 4$ so we can get 4 into each group, and there will be 2 left over.
Answer: 4 rem. 2

10 the division algorithm

Questions – Part 1 of 1

10.1 Calculate the following divisions. Note that the expected detail in your working is demonstrated in the examples on the right.

a. $7160 \div 8$ b. $3832 \div 8$ c. $8276 \div 4$ d. $1696 \div 8$ e. $4692 \div 6$

f. $2872 \div 8$ g. $8970 \div 6$ h. $1750 \div 5$ i. $2187 \div 3$ j. $2616 \div 4$

k. $4431 \div 7$ l. $3464 \div 4$ m. $9312 \div 4$ n. $9296 \div 4$ o. $6126 \div 3$

Answers

a. 895 b. 479 c. 2069 d. 212 e. 782 f. 359 g. 1495 h. 350 i. 729 j. 654 k. 633 l. 866 m. 2328 n. 2324 o. 2042

Helpful Information

Strategy for Division Algorithm: Think "Equal Sharing"

Setting up the algorithm:

1. Write the first number (7160 in this example)
2. Draw a line above the number and a curved line to its left
3. Write the second number, the divisor (8 in this example) to the left of the curved line

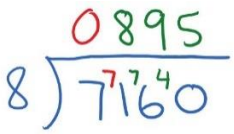
Calculating the answer:

1. Start with the digit in the biggest place value of the number you are dividing (7 in this example)
    a. Share it equally into the number of groups specified by the divisor (8 in this example)
    b. Write the number in each group directly above (0 written above 7 in this example).
    c. Write the remainder, if there is one, above the next digit in the number you are dividing (7 in this example).
2. Continue dividing each new number as you move from left to right.
3. If there is a remainder after you've divided the ones column you can either
    a. Specify the remainder at the end or
    b. Calculate your answer as a decimal by adding zeros after the ones digit and continuing the division process.

Example

Question: $7160 \div 8$

Working out: Using the above strategy…



Answer: 895

11 missing number questions

Questions Part 1 of 3 - Missing Number Equations, Multiplying by 2

11a Fill in each box with a whole number to make the equation true.

a. $2 \times \square = 36$ b. $2 \times \square = 90$ c. $2 \times \square = 56$ d. $2 \times \square = 52$

e. $2 \times \square = 88$ f. $2 \times \square = 92$ g. $2 \times \square = 82$ h. $2 \times \square = 74$

i. $2 \times \square = 76$ j. $2 \times \square = 86$ k. $2 \times \square = 68$ l. $2 \times \square = 58$

Answers

a. 18 b. 45 c. 28 d. 26 e. 44 f. 46 g. 41 h. 37 i. 38 j. 43 k. 34 l. 29

Helpful Information

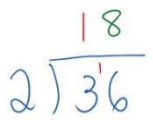
Missing number questions involving multiplication can be solved using division. For example, $2 \times \square = 86$ asks us to work out "how many groups of 2 make 86?". This can be answered by calculating $86 \div 2$.

Example

Question: Fill in the box below with a whole number to make the equation true.

$$2 \times \square = 36$$

Thought process: How many groups of 2 make 36?



$36 \div 2 = 18$ so 18 groups of 2 make 36.

Answer:

$$2 \times \boxed{18} = 36$$

Questions Part 2 of 3 - Missing Number Equations, Multiplying by 3

11b Fill in each box with a whole number to make the equation true.

a. $3 \times \square = 84$ b. $3 \times \square = 90$ c. $3 \times \square = 51$ d. $3 \times \square = 72$

e. $3 \times \square = 48$ f. $3 \times \square = 63$ g. $3 \times \square = 57$ h. $3 \times \square = 96$

i. $3 \times \square = 54$ j. $3 \times \square = 84$ k. $3 \times \square = 78$ l. $3 \times \square = 45$

Answers

a. 28 b. 30 c. 17 d. 24 e. 16 f. 21 g. 19 h. 32 i. 18 j. 28 k. 26 l. 15

Helpful Information

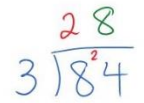
Missing number questions involving multiplication can be solved using division. For example, $3 \times \square = 57$ asks us to work out "how many groups of 3 make 57?". This can be answered by calculating $57 \div 3$.

Example

Question: Fill in the box below with a whole number to make the equation true.

$$3 \times \square = 84$$

Thought process: How many groups of 3 make 84?



$84 \div 3 = 28$ so 28 groups of 3 make 84.

Answer:

$$3 \times \boxed{28} = 84$$

Questions Part 3 of 3 - Missing Number Equations, Multiplying by 5

11c Fill in each box with a whole number to make the equation true.

a. $5 \times \square = 85$ b. $5 \times \square = 70$ c. $5 \times \square = 65$ d. $5 \times \square = 100$

e. $5 \times \square = 90$ f. $5 \times \square = 75$ g. $5 \times \square = 110$ h. $5 \times \square = 120$

i. $5 \times \square = 105$ j. $5 \times \square = 65$ k. $5 \times \square = 95$ l. $5 \times \square = 80$

Answers

a. 17 b. 14 c. 13 d. 20 e. 18 f. 15 g. 22 h. 24 i. 21 j. 13 k. 19 l. 16

Helpful Information

Missing number questions involving multiplication can be solved using division. For example, $5 \times \square = 75$ asks us to work out "how many groups of 5 make 75?". This can be answered by calculating $75 \div 5$.

Example

Question: Fill in the box below with a whole number to make the equation true.

$$5 \times \square = 85$$

Thought process: How many groups of 5 make 85?

$85 \div 5 = 17$ so 17 groups of 5 make 85.

Answer:

$$5 \times \boxed{17} = 85$$

12a factors

Questions Part 1 of 4 - Completing Factor Pairs with the number 2

12a.1 Where possible fill in each box with a whole number to make the equation true. If not possible, put a cross in the box.

a. $56 = 2 \times \square$ b. $29 = 2 \times \square$ c. $41 = 2 \times \square$ d. $64 = 2 \times \square$

e. $72 = 2 \times \square$ f. $94 = 2 \times \square$ g. $93 = 2 \times \square$ h. $76 = 2 \times \square$

i. $98 = 2 \times \square$ j. $75 = 2 \times \square$ k. $33 = 2 \times \square$ l. $49 = 2 \times \square$

Answers

a. 28 b. x c. x d. 32 e. 36 f. 47 g. x h. 38 i. 49 j. x k. x l. x

Helpful Information

The **factors** of a whole number are the numbers that divide it exactly. The **factors** of 20 are 1, 20, 2, 10, 4, 5.

Notice that each factor has a natural pair as 1x20=20, 2x10=20 and 4x5=20. These pairs are called **factor pairs**.

1 is a factor of every number and paired with the number itself.

2 is a factor of a whole number if the last digit is a 0, 2, 4, 6 or 8.

Examples

Question: If possible, fill in the box below with a whole number to make the equation true. If not possible, put a cross in the box.

$$56 = 2 \times \square$$

Thought process: 56 ends in a 6 so 2 is a factor. We divide 56 by 2 to work out the missing number.

$$2\overline{)56} \quad 28$$

Answer:

$$56 = 2 \times \boxed{28}$$

Question: If possible, fill in the box below with a whole number to make the equation true. If not possible, put a cross in the box.

$$29 = 2 \times \square$$

Thought process: 29 ends in a 9 so 2 is not a factor.

Answer:

$$29 = 2 \times \boxed{x}$$

Questions Part 2 of 4 - Completing Factor Pairs with the number 5

12a.2 Where possible fill in each box with a whole number to make the equation true. If not possible, put a cross in the box.

a. $95 = 5 \times \square$ b. $75 = 5 \times \square$ c. $62 = 5 \times \square$ d. $83 = 5 \times \square$

e. $85 = 5 \times \square$ f. $70 = 5 \times \square$ g. $72 = 5 \times \square$ h. $81 = 5 \times \square$

i. $68 = 5 \times \square$ j. $80 = 5 \times \square$ k. $85 = 5 \times \square$ l. $65 = 5 \times \square$

Answers

a. 19 b. 15 c. x d. x e. 19 f. 14 g. x h. x i. x j. 16 k. 17 l. 13

Helpful Information

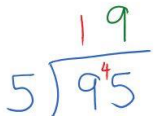
5 is a factor of a whole number if the last digit is a 0 or 5.

Example

Question: If possible, fill in the box below with a whole number to make the equation true. If not possible, put a cross in the box.

$$95 = 5 \times \square$$

Thought process: 95 ends in a 5 so 5 is a factor. We divide 95 by 5 to work out the missing number.



Answer:

$$95 = 5 \times \boxed{19}$$

Questions Part 3 of 4 - Completing Factor Pairs with the number 3

12a.3 Where possible fill in each box with a whole number to make the equation true. If not possible, put a cross in the box.

a. $75 = 3 \times \square$ b. $91 = 3 \times \square$ c. $38 = 3 \times \square$ d. $84 = 3 \times \square$

e. $51 = 3 \times \square$ f. $67 = 3 \times \square$ g. $99 = 3 \times \square$ h. $96 = 3 \times \square$

i. $81 = 3 \times \square$ j. $78 = 3 \times \square$ k. $79 = 3 \times \square$ l. $80 = 3 \times \square$

Answers

a. 25 b. x c. x d. 28 e. 17 f. x g. 33 h. x i. 27 j. 28 k. x l. x

Helpful Information

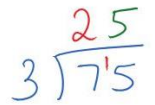
3 is a factor of a whole number if the sum of its digits is divisible by 3

Example

Question: If possible, fill in the box below with a whole number to make the equation true. If not possible, put a cross in the box.

$$75 = 3 \times \square$$

Thought process: 7+5=12, since 12 is divisible by 3, 3 is a factor of 75. We divide 75 by 5 to work out the missing number.



Answer:

$$84 = 3 \times \boxed{28}$$

Questions Part 4 of 4 – Listing Factors of Numbers

12a.4 List the factors of each number.

a. 36	b. 27	c. 33	d. 46	e. 28
f. 18	g. 16	h. 24	i. 23	j. 35
k. 20	l. 25	m. 37	n. 41	o. 22
p. 60	q. 53	r. 48	s. 17	t. 33

Answers

a. 1, 36, 2, 18, 3, 12, 4, 9, 6 b. 1,27,3,9 c. 1,33,3,11 d. 1,46,2,23 e. 1,28,2,14,4,7
f. 1,18,2,9,3,6 g. 1,16,2,8,4 h. 1,24,2,12,3,8,4,6 i. 1,23 j. 1,35,5,7 k. 1,20,2,10,4,5
l. 1,25,5 m. 1,37 n. 1,41 o. 1,22,2,11 p. 1,60,2,30,3,20,4,15,5,12,6,10 q. 1,53
r. 1,48,2,24,3,16,4,12,6,8 s. 1,17 t. 1,33,3,11

Helpful Information

We have now seen efficient ways for determining if 1, 2, 5 and 3 are factors of a number.

When we are listing the factors of a number, we can use the following table to help us check if a number is a factor.

Number	Is a factor if…
1	Always a factor
2	The final digit of the number is a 0, 2, 4, 6 or 8
3	The sum of the digits is part of the 3 times tables
4	The factor pair with 2 is an even number
5	The final digit of the number is a 0 or 5
6	The factor pair with 3 is an even number
7	Check using division
8	The factor pair with 4 is an even number
9	The sum of the digits is part of the 9 times tables
10	The final digit of the number is a 0

Example

Question: List the factors of 36
Thought process: Is 1 a factor? Yes, 36=1x36
Is 2 a factor? Yes because the number ends in a 6, 36=2x18
Is 3 a factor? Yes because 3+6=9 and 9 is divisible by 3, 36=3x12
Is 4 a factor? Yes, 36=4x9 (because the factor pair with 2 is even)
Is 5 a factor? No, because the number ends in a 6
Is 6 a factor? Yes, 36=6x6 (because the factor pair with 3 is even)
There is no need to check any larger numbers as any number bigger than 6 would need to be paired with a number smaller than 6 and these have all been checked.
Answer: 1, 36, 2, 18, 3, 12, 4, 9, 6

12b multiples

Questions – Part 1 of 1

12b

List the first 10 positive multiples of the following numbers.

a. 5 b. 8 c. 12 d. 4 e. 10

List the first 8 positive multiples of the following numbers.

f. 9 g. 2 h. 3 i. 11 j. 13

List the first 12 positive multiples of the following numbers.

k. 7 l. 6

Answers

a. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50
b. 8, 16, 24, 32, 40, 48, 56, 64, 72, 80
c. 12, 24, 36, 48, 60, 72, 84, 96, 108, 120
d. 4, 8, 12, 16, 20, 24, 28, 32, 36, 40
e. 10, 20, 30, 40, 50, 60, 70, 80, 90, 100
f. 9, 18, 27, 36, 45, 54, 63, 72
g. 2, 4, 6, 8, 10, 12, 14, 16
h. 3, 6, 9, 12, 15, 18, 21, 24
i. 11, 22, 33, 44, 55, 66, 77, 88
j. 13, 26, 39, 52, 65, 78, 91, 104
k. 7, 14, 21, 28, 35, 42, 49, 56, 63, 70, 77, 84
l. 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 66, 72

Helpful Information

A **product** is the answer when two or more numbers are multiplied together. For example, the product of 2 and 3 is 6.

A **multiple** of a number is a product of that whole number with any other whole number.

Examples

Question: List the first 10 positive multiples of 5

Thought process: The first positive multiple of 5 is 1x5, the second is 2x5, the third is 3x5 and so on. This means that the first 10 positive multiples of 5 are 5, 10, 15, 20, 25, 30, 35, 40, 45 and 50

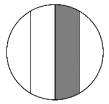
Answer: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

13 Fraction models

Questions Part 1 of 2 – Fractions and the Importance of Equal Parts

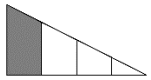
13.1 Keeping in mind that the denominator tells you how many equal parts the whole is broken into, say whether the following statements are true or false.

a. True or False: The picture below represents $\frac{1}{4}$

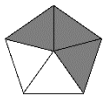


b. True or False: The picture below represents $\frac{1}{4}$

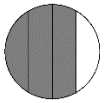
c. True or False: The picture below represents $\frac{1}{4}$



d. True or False: The picture below represents $\frac{3}{5}$



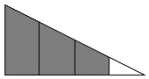
e. True or False: The picture below represents $\frac{3}{4}$



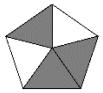
f. True or False: The picture below represents $\frac{3}{5}$

g. True or False: The picture below represents $\frac{1}{4}$

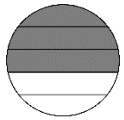
h. True or False: The picture below represents $\frac{3}{4}$



i. True or False: The picture below represents $\frac{3}{5}$



j. True or False: The picture below represents $\frac{3}{5}$



k. True or False: The picture below represents $\frac{3}{4}$

l. True or False: The picture below represents $\frac{1}{4}$

Answers

a. F b. T c. F d. T e. F f. T g. T h. F i. T j. F k. T l. T

Helpful Information

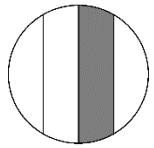
A **fraction** is a number that is written as one whole number over another whole number. For example, $\frac{1}{2}$, $\frac{15}{9}$, $\frac{12}{2}$ are all fractions, though $\frac{1.5}{3}$ is not a fraction.

The number on the top is called the **numerator** and the number on the bottom is called **denominator**. For example, in the fraction $\frac{5}{9}$, 5 is the numerator and 9 is the denominator. To remember this you can use the saying "denominator down".

The denominator tells you how many **equal** parts the whole is broken into and the numerator tells you how many of those parts are taken.

Example

Question: Is the following statement true or false? The picture below represents $\frac{1}{4}$

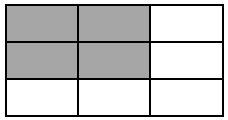


Thought process: The circle cannot be divided into four equal parts that are the size of the shaded region. So, this picture does not represent $\frac{1}{4}$

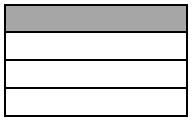
Answer: False

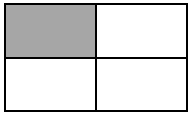
Questions Part 2 of 2 – Fractions Represented in Rectangles

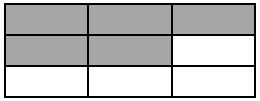
13.2 What fraction is represented in each diagram below?

a. 

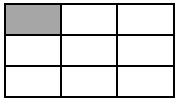
b. 

c. 

d. 

e. 

f. 

g. 

h. 

i. 

Answers

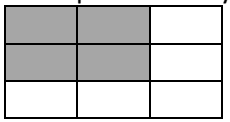
a. $\frac{4}{9}$ b. $\frac{3}{4}$ c. $\frac{1}{4}$ d. $\frac{1}{4}$ e. $\frac{5}{9}$ f. $\frac{5}{8}$ g. $\frac{1}{9}$ h. $\frac{4}{5}$ i. $\frac{6}{7}$

Helpful Information

Recall that the denominator, the bottom number of a fraction, indicates how many equal parts the whole is broken into and the numerator, the top number of a fraction, indicates how many parts are taken (or in this case shaded).

Example

Question: What fraction is represented by the diagram below?



Thought process: The rectangle is divided into 9 equal parts so the denominator is 9, there are four rectangles shaded so the numerator is 4.

Answer: $\frac{4}{9}$

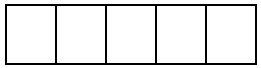
14 adding fractions with a common denominator

🖷 To be printed or completed using a stylus

Questions Part 1 of 2 – Shading Fractions

14.1 Shade the rectangle in each question to represent the fraction.

a. $\frac{2}{5}$



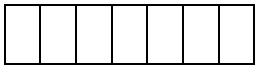
b. $\frac{1}{4}$

c. $\frac{2}{4}$

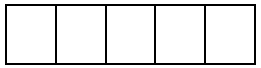
d. $\frac{3}{4}$

e. $\frac{5}{6}$

f. $\frac{6}{7}$

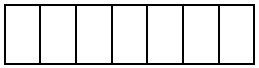


g. $\frac{4}{5}$



h. $\frac{3}{9}$

i. $\frac{4}{7}$



Answers

a. $\frac{2}{5}$

b. $\frac{1}{4}$

c. $\frac{2}{4}$

d. $\frac{3}{4}$

e. $\frac{5}{6}$

f. $\frac{6}{7}$

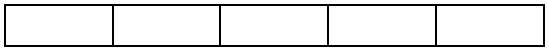
g. $\frac{4}{5}$

h. $\frac{3}{9}$

i. $\frac{4}{7}$

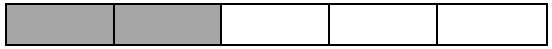
Example

Question: Shade the fraction $\frac{2}{5}$ using the rectangle below



Thought process: The rectangle is divided into 5 equal parts which is great because the denominator is 5. Since the numerator is 2 I need to shade 2 parts.

Answer:

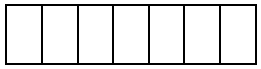


🖷 To be printed or completed using a stylus

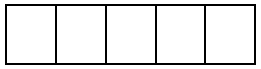
Questions Part 2 of 2 – Adding fractions with a common denominator

14.2 Calculate the following. Illustrate your calculation using the rectangle provided.

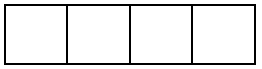
a. $\frac{2}{7}+\frac{3}{7}$



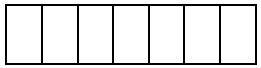
b. $\frac{1}{5}+\frac{1}{5}$



c. $\frac{2}{4}+\frac{1}{4}$



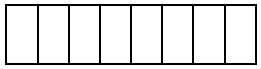
d. $\frac{3}{7}+\frac{2}{7}$



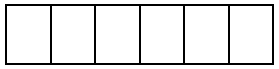
e. $\frac{2}{5}+\frac{2}{5}$

f. $\frac{1}{4}+\frac{2}{4}$

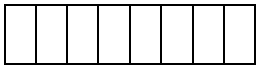
g. $\frac{4}{8}+\frac{3}{8}$



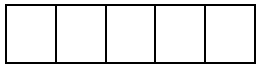
h. $\frac{2}{6}+\frac{3}{6}$



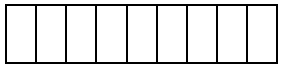
i. $\frac{1}{8}+\frac{2}{8}$



j. $\frac{1}{5}+\frac{2}{5}$



k. $\frac{3}{9}+\frac{2}{9}$



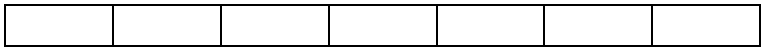
l. $\frac{4}{7}+\frac{1}{7}$

Answers

a. $\frac{5}{7}$ b. $\frac{2}{7}$ c. $\frac{3}{4}$ d. $\frac{5}{7}$ e. $\frac{4}{5}$ f. $\frac{3}{4}$ g. $\frac{7}{8}$ h. $\frac{5}{6}$ i. $\frac{3}{8}$ j. $\frac{3}{5}$ k. $\frac{5}{9}$ l. $\frac{5}{7}$

Example

Question: Calculate $\frac{2}{7}+\frac{3}{7}$. Illustrate your calculating using the rectangle below.



Thought process: The first fraction is $\frac{2}{7}$ so begin by shading $\frac{2}{7}$. Need to add on $\frac{3}{7}$ so shade three more parts.

There are now 5 parts out of 7 shaded so the answer is $\frac{5}{7}$

Answer: $\frac{5}{7}$

15 Fraction of a number

Questions

15.1 Calculate the following. Support your calculation by writing numbers in the rectangles below.

a. i. $\frac{1}{3}$ of 12 ii. $\frac{2}{3}$ of 12

b. i. $\frac{1}{7}$ of 63 ii. $\frac{3}{7}$ of 63

c. i. $\frac{1}{3}$ of 27 ii. $\frac{2}{3}$ of 27

d. i. $\frac{1}{5}$ of 40 ii. $\frac{3}{5}$ of 40

e. i. $\frac{1}{10}$ of 70 ii. $\frac{7}{10}$ of 70

f. i. $\frac{1}{4}$ of 36 ii. $\frac{3}{4}$ of 36

g. i. $\frac{1}{3}$ of 30 ii. $\frac{2}{3}$ of 30

h. i. $\frac{1}{5}$ of 20 ii. $\frac{3}{5}$ of 20

i. i. $\frac{1}{3}$ of 24 ii. $\frac{2}{3}$ of 24

j. i. $\frac{1}{5}$ of 40 ii. $\frac{3}{5}$ of 40

k. i. $\frac{1}{5}$ of 45 ii. $\frac{4}{5}$ of 45

l. i. $\frac{1}{7}$ of 63 ii. $\frac{4}{7}$ of 63

m. i. $\frac{1}{5}$ of 15 ii. $\frac{4}{5}$ of 15

n. i. $\frac{1}{7}$ of 49 ii. $\frac{5}{7}$ of 49

o. i. $\frac{1}{4}$ of 16 ii. $\frac{3}{4}$ of 16

p. i. $\frac{1}{6}$ of 24 ii. $\frac{3}{4}$ of 24

q. i. $\frac{1}{8}$ of 48 ii. $\frac{5}{8}$ of 48

r. i. $\frac{1}{5}$ of 40 ii. $\frac{4}{5}$ of 40

s. i. $\frac{1}{4}$ of 12 ii. $\frac{3}{4}$ of 12

t. i. $\frac{1}{6}$ of 42 ii. $\frac{5}{6}$ of 42

Answers

a. 4, 8 b. 9, 27 c. 9, 18 d. 8, 24 e. 7, 49 f. 9, 27 g. 10, 20 h. 4, 12 i. 8, 16 j. 8, 24 k. 9, 36 l. 9, 36 m. 3, 12 n. 7, 35 o. 4, 12 p. 4, 12 q. 6, 30 r. 8, 32 s. 3, 9 t. 7, 35

Helpful Information

A **fraction** is a number that is written as one whole number over another whole number. For example, $\frac{1}{2}$, $\frac{15}{9}$, $\frac{12}{2}$ are all fractions, though $\frac{1.5}{3}$ is not a fraction.

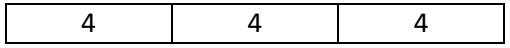
The number on the top is called the **numerator** and the number on the bottom is called **denominator**. For example, in the fraction $\frac{5}{9}$, 5 is the numerator and 9 is the denominator. To remember this you can use the saying "denominator down".

The denominator tells you how many **equal** parts the whole is broken into and the numerator tells you how many of those parts are taken.

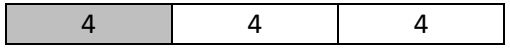
Example

Question: Calculate i. $\frac{1}{3}$ of 12 ii. $\frac{2}{3}$ of 12.

Thought process: To calculate $\frac{1}{3}$ of a number we need to divide the number into 3 equal parts. $12 \div 3 = 4$. So we write the number 4 in each third of the rectangle.



Shading $\frac{1}{3}$ of the rectangle



…we see that $\frac{1}{3}$ of 12 is 4.

$\frac{2}{3}$ of 12 is shaded below.

We can see that this is 2x4=8.

Answer: 4, 8

16 equivalent fractions

🖷 To be printed or completed using a stylus

Questions Part 1 of 2 – Shading equivalent fractions

16.1 Draw horizontal lines to create an appropriate number of total equal parts as specified by the denominator in the second fraction. Then fill in the box to make the equation true.

a. $\frac{4}{9}=\frac{\square}{27}$ 

b. $\frac{3}{9}=\frac{\square}{18}$ 

c. $\frac{4}{7}=\frac{\square}{14}$ 

d. $\frac{1}{4}=\frac{\square}{20}$ 

e. $\frac{2}{5}=\frac{\square}{20}$ 

f. $\frac{2}{4}=\frac{\square}{16}$ 

g. $\frac{3}{4}=\frac{\square}{12}$ 

h. $\frac{5}{6}=\frac{\square}{12}$ 

i. $\frac{6}{7}=\frac{\square}{21}$ 

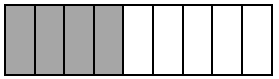
Answers

a. 12 b. 6 c. 8 d. 5 e. 8 f. 8 g. 9 h. 10 i.18

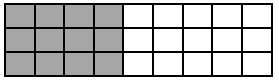
Example

Question: Draw horizontal lines to create an appropriate number of total equal parts as specified by the denominator in the second fraction. Then fill in the box to make the equation true.

$\frac{4}{9}=\frac{\square}{27}$



Thought process: The rectangle has been divided into 9 equal parts and we need to have 27 equal parts. This means we need to create 3 rows and for this we need to draw two horizontal lines.



We now have 12 parts shaded so the numerator must be 12.

Answer: 12

Questions Part 2 of 2 – Completing equivalent fractions

16.2 Fill in the boxes to create equivalent fractions.

a. $\frac{2}{5}=\frac{\square}{20}$ b. $\frac{4}{5}=\frac{\square}{20}$ c. $\frac{4}{7}=\frac{\square}{21}$ d. $\frac{3}{8}=\frac{\square}{56}$ e. $\frac{2}{5}=\frac{\square}{50}$

f. $\frac{2}{7}=\frac{\square}{14}$ g. $\frac{1}{2}=\frac{\square}{10}$ h. $\frac{3}{7}=\frac{\square}{35}$ i. $\frac{1}{3}=\frac{\square}{15}$ j. $\frac{1}{6}=\frac{\square}{42}$

k. $\frac{2}{5}=\frac{\square}{35}$ l. $\frac{5}{8}=\frac{\square}{32}$ m. $\frac{4}{7}=\frac{\square}{21}$ n. $\frac{1}{3}=\frac{\square}{12}$ o. $\frac{5}{8}=\frac{\square}{32}$

p. $\frac{5}{6}=\frac{\square}{24}$ q. $\frac{1}{6}=\frac{\square}{48}$ r. $\frac{1}{7}=\frac{\square}{63}$ s. $\frac{1}{4}=\frac{\square}{16}$ t. $\frac{3}{8}=\frac{\square}{24}$

Answers

a. 8 b. 16 c. 12 d. 21 e. 20 f. 4 g. 5 h. 15 i. 5 j. 7 k. 14 l. 20 m. 12 n. 4 o. 20 p. 20 q. 8 r. 9 s. 4 t. 9

Helpful Information

Equivalent fractions are different fraction representations of the same number.

Example

Question: Fill in the box to create an equivalent fraction: $\frac{2}{5}=\frac{\square}{20}$

Thought process: The fraction $\frac{2}{5}$ can be made into an equivalent fraction with a denominator of 20 by creating 4 times as many equal parts. This means that there will be 4 times as many shaded parts, so the number of shaded parts is found by calculating 2x4=8.

Answer: 8

17 simplifying fractions

Questions Part 1 of 2 – Checking if numbers are factors

17.1 Where possible fill in each box with a whole number to make the equation true. If not possible, put in a cross. Use the completed equations to answer each question.

a. $2 \times \square = 18$ $2 \times \square = 15$
Is 2 a common factor of 18 and 15?

b. $2 \times \square = 16$ $2 \times \square = 20$
Is 2 a common factor of 16 and 20?

c. $2 \times \square = 27$ $2 \times \square = 36$
Is 2 a common factor of 27 and 36?

d. $3 \times \square = 27$ $3 \times \square = 36$
Is 3 a common factor of 27 and 36?

e. $2 \times \square = 15$ $2 \times \square = 40$
Is 5 a common factor of 15 and 40?

f. $3 \times \square = 15$ $4 \times \square = 40$
Is 3 a common factor of 15 and 40?

g. $5 \times \square = 15$ $5 \times \square = 40$
Is 5 a common factor of 15 and 40?

h. $3 \times \square = 45$ $3 \times \square = 54$
Is 3 a common factor of 45 and 54?

Answers

a. No b. Yes c. No d. Yes e. No f. No g. Yes h. Yes

Helpful Information

Multiplying the numerator and denominator of a fraction by the same value creates an equivalent fraction. This means that if we can divide the numerator and denominator by the same number then this creates an equivalent fraction also.

Identifying a number that is factor of the numerator and denominator is a key skill in simplifying fractions.

Example

Question: Where possible fill in each box with a whole number to make the equation true. If not possible, put in a cross. Use the completed equations to help decide if 2 is a common factor of 18 and 15.

$$2 \times \square = 18 \qquad 2 \times \square = 15$$

Thought process: While we can fill in the first box with the number 9, there is no whole number that goes into the second box. So 2 is not a factor of 15

Answer: 2 is not a common factor of 18 and 15

Questions Part 2 of 2 – Simplifying fractions

17.2 Simplify the fractions below.

a. $\frac{18}{42}$ b. $\frac{48}{60}$ c. $\frac{16}{20}$ d. $\frac{15}{75}$ e. $\frac{12}{24}$

f. $\frac{36}{48}$ g. $\frac{8}{80}$ h. $\frac{30}{42}$ i. $\frac{4}{8}$ j. $\frac{8}{16}$

k. $\frac{42}{56}$ l. $\frac{12}{40}$ m. $\frac{16}{28}$ n. $\frac{27}{36}$ o. $\frac{6}{24}$

p. $\frac{120}{135}$ q. $\frac{6}{30}$ r. $\frac{32}{40}$ s. $\frac{8}{24}$ t. $\frac{16}{30}$

Answers

a. $\frac{3}{7}$ b. $\frac{4}{5}$ c. $\frac{4}{5}$ d. $\frac{1}{5}$ e. $\frac{1}{2}$ f. $\frac{3}{4}$ g. $\frac{1}{10}$ h. $\frac{5}{7}$ i. $\frac{1}{2}$ j. $\frac{1}{2}$ k. $\frac{3}{4}$ l. $\frac{3}{10}$ m. $\frac{4}{7}$ n. $\frac{3}{4}$ o. $\frac{1}{4}$ p. $\frac{8}{9}$ q. $\frac{1}{5}$ r. $\frac{4}{5}$ s. $\frac{1}{3}$ t. $\frac{8}{15}$

Helpful Information

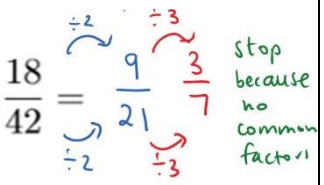
A **simplified fraction** or a fraction written in its **simplest form** is a fraction where the numerator and denominator have no factors in common.

For example, $\frac{2}{3}$ and $\frac{4}{15}$ are simplified fractions, though $\frac{6}{9}$ and $\frac{8}{30}$ are not.

Example

Question: Write $\frac{18}{42}$ as a simplified fraction.

Thought process: 18=2x9 and 42=2x21 so 2 is a common factor and we can simplify $\frac{18}{42}$ to $\frac{9}{21}$. 2 is not a factor of 9, so we try 3. 9=3x3 and 21=3x7 so we can simplify $\frac{9}{21}$ to $\frac{3}{7}$. 3 and 7 have no common factors and so is a simplified fraction.



Answer: $\frac{3}{7}$

18 adding and subtracting fractions with related denominators

18.1 Complete the following questions. Answers can be given as improper fractions or mixed numbers.

a. $\frac{3}{5}+\frac{1}{10}$ b. $\frac{5}{24}+\frac{5}{8}$ c. $\frac{3}{4}+\frac{1}{24}$ d. $\frac{2}{9}+\frac{7}{36}$

e. $\frac{7}{20}+\frac{3}{10}$ f. $\frac{2}{7}+\frac{1}{14}$ g. $\frac{4}{24}+\frac{5}{8}$ h. $\frac{4}{5}+\frac{1}{25}$

i. $\frac{4}{8}+\frac{2}{40}$ j. $\frac{4}{5}+\frac{1}{10}$ k. $\frac{6}{7}+\frac{1}{14}$ l. $\frac{1}{15}+\frac{2}{5}$

m. $\frac{1}{4}+\frac{5}{8}$ n. $\frac{4}{8}+\frac{1}{16}$ o. $\frac{5}{6}+\frac{2}{18}$ p. $\frac{1}{5}+\frac{3}{10}$

q. $\frac{2}{21}+\frac{4}{7}$ r. $\frac{2}{3}+\frac{2}{15}$ s. $\frac{1}{3}+\frac{1}{15}$ t. $\frac{5}{9}+\frac{4}{27}$

Answers

a. $\frac{7}{10}$ b. $\frac{5}{6}$ c. $\frac{19}{24}$ d. $\frac{5}{12}$ e. $\frac{13}{20}$ f. $\frac{5}{14}$ g. $\frac{19}{24}$ h. $\frac{21}{25}$ i. $\frac{11}{20}$ j. $\frac{9}{10}$ k. $\frac{13}{14}$ l. $\frac{7}{15}$ m. $\frac{7}{8}$ n. $\frac{9}{16}$ o. $\frac{17}{18}$

p. $\frac{1}{2}$ q. $\frac{2}{3}$ r. $\frac{4}{5}$ s. $\frac{2}{5}$ t. $\frac{19}{27}$

Helpful Information

Strategy for Adding Fractions with Different Denominators

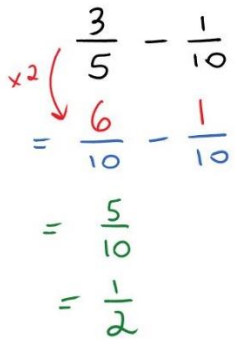
1. Identify a common multiple of the denominators
2. Re-write the fraction sum using equivalent fractions whose denominators are this common multiple
3. Add the fractions
4. Simplify the fraction if possible

If the answer is bigger than 1, you may choose if you write your answer as an improper fraction or as a mixed number.

Example

Question: Calculate $\frac{3}{5}-\frac{1}{10}$

Thought process: Using the above strategy we have…



Answer: $\frac{1}{2}$

19 estimating and classifying angles

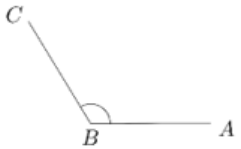
Prerequisite skills

- Familiarity of numbers between 0 and 180.

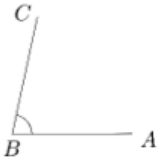
Questions Part 1 of 2 – Classifying an angle

19.1 For each of the angles below state whether it is an acute angle, a right angle, an obtuse angle or a straight angle.

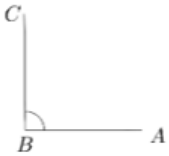
a.



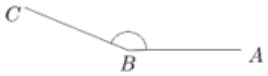
b.



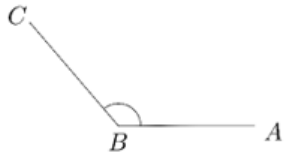
c.



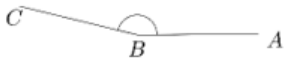
d.



e.

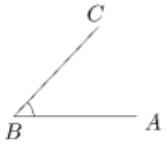


f.

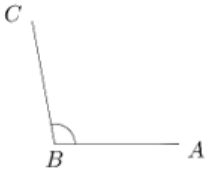


g.

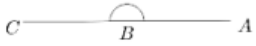
h.



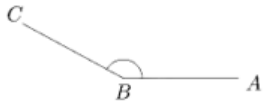
i.



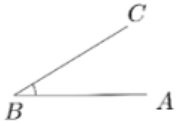
j.



k.



l.

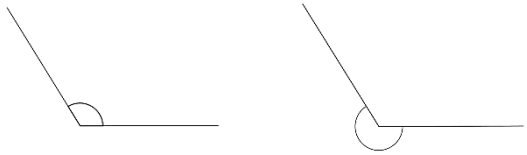


Answers

a. obtuse b. acute c. right d. obtuse e. obtuse f. obtuse g. acute h. acute i. obtuse j. straight k. obtuse l. acute

Helpful Information

When two lines meet at a point two angles are created as shown below

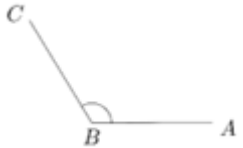


Angles vary in size and we measure an angle by seeing how much turn is required to travel from one line to the other.

- Angles are measured in **degrees** and the unit is represented by °
- $360°$ is one full turn, or **a revolution** and this forms the scale from which all other angles are measured.
- A **straight angle** is a half turn and equal to $180°$.
- A **right angle** (shown on the right) is a quarter turn and equal to $90°$.
- An angle less than $90°$ is called an **acute angle**.
- An angle more than $90°$ but less than $180°$ is called an **obtuse angle**.
- An angle more than $180°$ but less than $360°$ is called a **reflex angle**.

Example

Question: For the angle below, state whether it is an acute angle, a right angle, an obtuse angle or a straight angle.



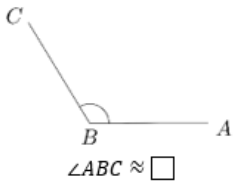
Thought process: This angle has more turn than a right angle so is obtuse.

Answer: Obtuse

Questions Part 2 of 2 – Estimating the size on an angle

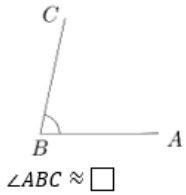
19.2 Estimate the size of each angle below by filling in the box. If you answer is within 10° of the given answer it is considered correct.

a.



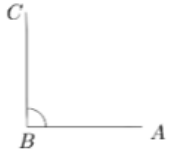
$\angle ABC \approx \square$

b.



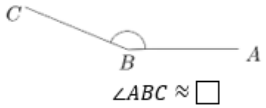
$\angle ABC \approx \square$

c.



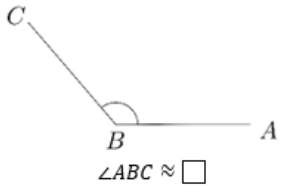
$\angle ABC \approx \square$

d.



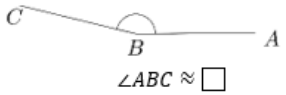
$\angle ABC \approx \square$

e.



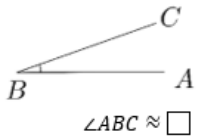
$\angle ABC \approx \square$

f.



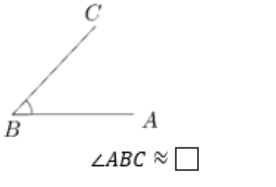
$\angle ABC \approx \square$

g.



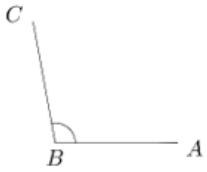
$\angle ABC \approx \square$

h.



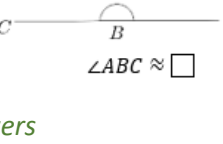
$\angle ABC \approx \square$

i.



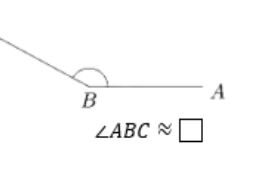
$\angle ABC \approx \square$

j.



$\angle ABC \approx \square$

k.



$\angle ABC \approx \square$

l.

$\angle ABC \approx \square$

Answers

a. 121° b. 77° c. 90° d. 157° e. 130° f. 166° g. 19° h. 46° i. 100° j. 180° k. 151° l. 30°

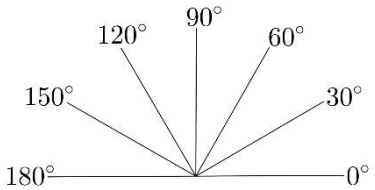
Helpful Information

If we label the three points that form an angle (like in the example below) we denote the angle as $\angle ABC$ or $\angle CBA$, where the middle letter must be the point where the angle is formed.

A right angle is often (but not always) denoted by a square rather than a circle.

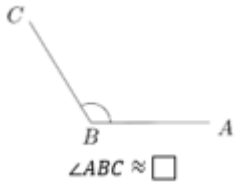
We use the symbol ≈ to represent approximately equal. In this skill, your answer will be considered correct if you are within 10 degrees of the actual angle.

When estimating the size on an angle it is helpful to use the angle guide. By comparing your angle to 0, 30, 60, 90, 120, 150 or 180 degrees you are going to be more successful in estimating the angle within 10 degrees of the exact angle.



Example

Question: Estimate the angle below by filling in the box.



$\angle ABC \approx \square$

Thought process: This angle is very close to 120°, maybe just a bit bigger.

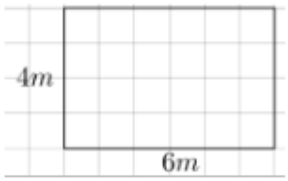
Answer: 121°

20 perimeter and area of a rectangle

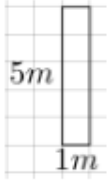
Questions Part 1 of 2 – Perimeter of a rectangle

20.1 Determine the perimeter of each rectangle below. You are required to include working for this question, which at a minimum is showing how you've added the sides together.

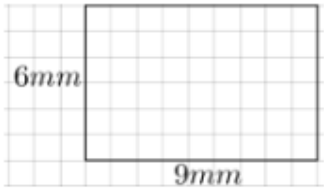
a.



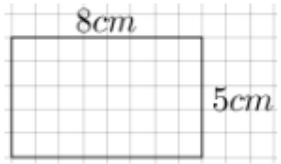
b.



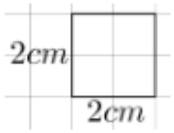
c.



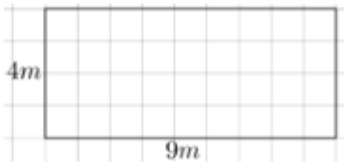
d.



e.

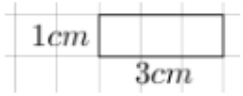


f.

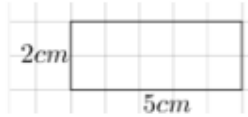


g.

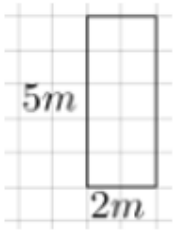
h.



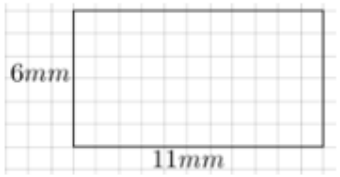
i.



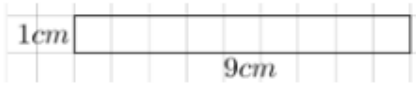
j.



k.



l.



Answers

a. $20m$ b. $12m$ c. $30mm$ d. $26cm$ e. $8cm$ f. $26m$ g. $16cm$ h. $8cm$ i. $14cm$ j. $14m$ k. $34mm$ l. $20cm$

Helpful Information

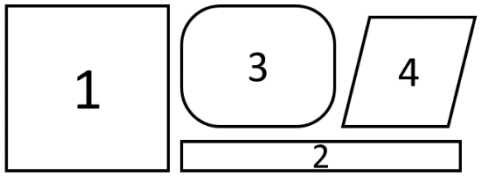
Length is a distance from one point to another.

The common **units** used when measuring lengths are: millimetres (mm), centimetres (cm), metres (m) and kilometres (km).

The **perimeter** of a shape is the total length around its outside.

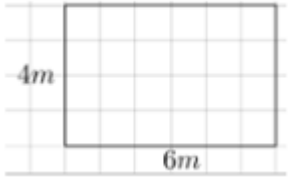
The word perimeter comes from two Greek words: peri meaning 'around' and metron meaning 'measure'.

A **rectangle** is defined as a quadrilateral (four-sided shape) with all angles equal to $90°$.Shapes 1 and 2 are rectangles, shapes 3 and 4 are not.



Example

Question: Determine the perimeter of the rectangle below



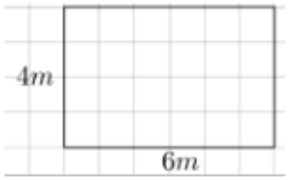
Thought process: Perimeter is the length around the outside of a shape. The length around the outside of this shape is found by adding up 6+4+6+4=20. As each length was in m (metres) the perimeter will have m as its units too.

Answer: 20m

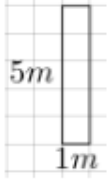
Questions Part 2 of 2 – Area of a rectangle

20.2 Determine the area of each rectangle below. You are required to include working for this question, which at a minimum is showing how you've multiplied the sides.

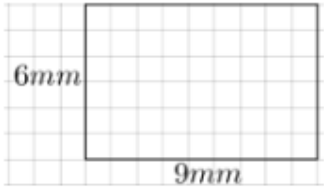
a.



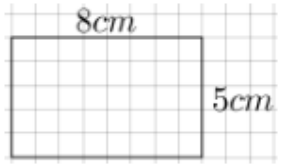
b.



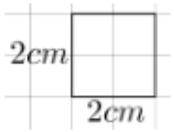
c.



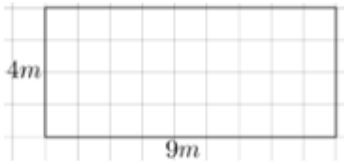
d.



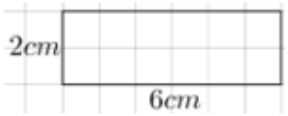
e.



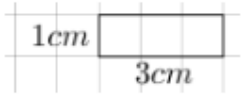
f.



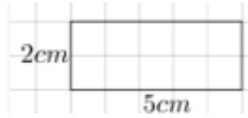
g.



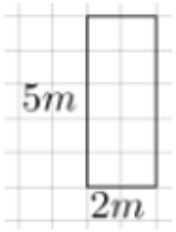
h.



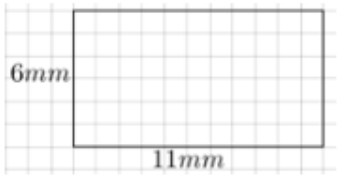
i.



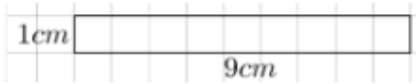
j.



k.



l.



Answers

a. $24m^2$ b. $5m^2$ c. $54mm^2$ d. $40cm^2$ e. $4cm^2$ f. $36m^2$ g. $12cm^2$ h. $3cm^2$ i. $10cm^2$ j. $10m^2$ k. $66mm^2$ l. $9cm^2$

Helpful Information

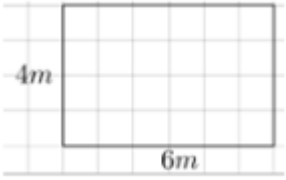
An **informal definition** of **area** is "a measure of the amount of material needed to 'cover' it".

The **formal definition** of area is "the area of a flat shape is the number of unit squares that are needed to cover it completely."

The common units used when measuring areas are square millimetres (mm^2), square centimetres (cm^2), square metres (m^2) and square kilometres (km^2).

Example

Question: Determine the area of the rectangle below



Thought process: Area is the number of unit squares needed to cover it completely. This rectangle is made up of 4 rows, each containing $6m^2$. The area can be found by multiplying 4 and 6. $4 \times 6 = 24$ and so the area is $24m^2$

Answer: $24m^2$

21 volume of a rectangular prism

Questions Part 1 of 2 – Multiplying three numbers together

21.1 Calculate the following products, using the commutative property of multiplication to make the order easier if needed.

a. $3 \times 6 \times 4$	b. $7 \times 2 \times 2$	c. $6 \times 2 \times 5$	d. $6 \times 5 \times 2$
e. $2 \times 8 \times 6$	f. $3 \times 7 \times 4$	g. $3 \times 6 \times 5$	h. $9 \times 3 \times 4$
i. $8 \times 2 \times 9$	j. $5 \times 9 \times 4$	k. $6 \times 5 \times 5$	l. $8 \times 2 \times 6$

Answers

a. 72 b. 28 c. 60 d. 60 e. 96 f. 84 g. 90 h. 108 i. 144 j. 180 k. 150 l. 96

Helpful Information

To carry out this skill you will need to multiply three numbers together.

Multiplication has the property of being **commutative** which means it can be carried out in any order.

Example

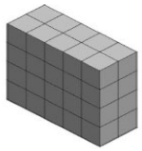
Question: Calculate $3 \times 6 \times 4$

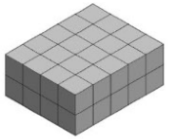
Thought process: The easiest way to calculate this product is to first multiply 3x4 to make 12 and then multiplying this by 6 to get 72.

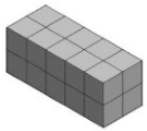
Answer: 72

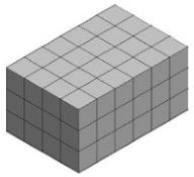
Questions Part 2 of 2 – Volume of a rectangular prism

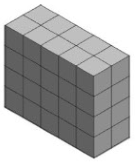
21.2 Calculate the volume of each shape below. Note: Each smaller cube has a volume of $1cm^3$. You are required to include working for this question, which at a minimum is showing how you've multiplied the sides.

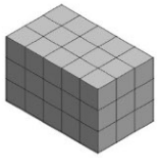
a. 

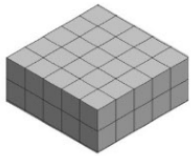
b. 

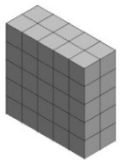
c. 

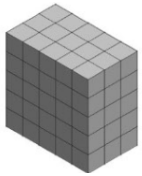
d. 

e. 

f. 

g. 

h. 

i. 

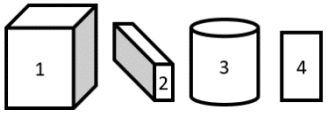
Answers a. 40cm^3 b. 40 cm^3 c. 20 cm^3 d. 72 cm^3 e. 40 cm^3 f. 45 cm^3 g. 50 cm^3 h. 50 cm^3 i. 75 cm^3

Helpful Information

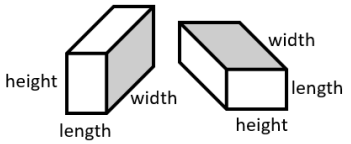
Volume is **informally defined** as "the measure of the space inside a 3 dimensional shape" and **formally defined** as "the number of unit cubes that either fit inside it or are used to make it."

The common units used when measuring volumes are cubic millimetres (mm^3), cubic centimetres (cm^3), cubic metres (m^3) and cubic kilometres (km^3).

A **rectangular prism** is a solid 3 dimensional figure where all sides are rectangles and all sides meet at $90°$. The first two shapes are rectangular prisms, the second two are not.

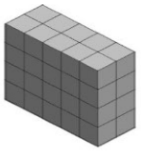


The **dimensions** of a rectangular prism are the **length**, **width** and **height** though it doesn't matter which name we allocate to each measurement as when the rectangular prism is turned around the dimensions don't change.



Example

Question: Calculate the volume of the shape on the right. Note: Each smaller cube has a volume of $1cm^3$.



Thought process: The "front" shape is made up of 2x4=8cm^3, the total shape is made up of 5 of the "front shape". So, the volume is found by calculating 2x4x5=40cm^3

Answer: 40cm^3