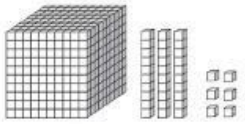
mathsquad skill sequence

Foundation skills:

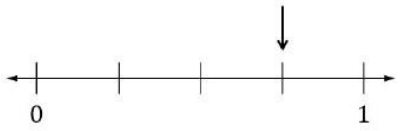
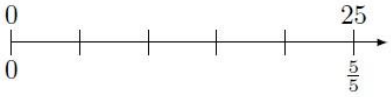
Skill Code and Descriptor	Sample question	Related Victorian curriculum link(s)
F01: Base 10 Blocks and Writing Numbers Using Words	1. What number is shown below? Use digits then words 	Grade 1: Recognise, model, read, write and order numbers to at least 100. Locate these numbers on a number line(VCMNA087) Grade 3: Recognise, model, represent and order numbers to at least 10 000 (VCMNA130)
F02: Multiplying by 10 and 100 and Rounding Whole Numbers	2. a. Calculate 5000×100 b. Round 63 to the nearest ten.	Grade 5: Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (VCMNA183) Use estimation and rounding to check the reasonableness of answers to calculations(VCMNA182)

F03: Mental Addition	3. a. $4 + 4 =$ b. $3 + 9 =$ c. $38 + 4 =$ d. $36 + 43 =$	Grade 3: Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation(VCMNA133) Grade 4: Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153)
F04: Addition Algorithm	4. ✎ $1224 + 2037$	Grade 4: Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153)

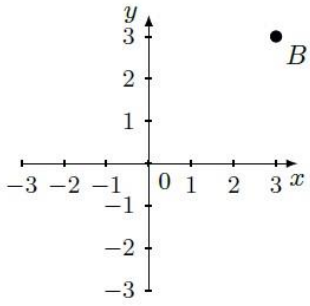
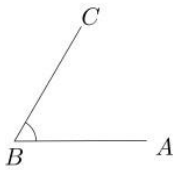
F05: Mental Subtraction	5. a. $7 - 6 =$ b. $17 - 8 =$ c. $23 - 16 =$ d. $43 - 29 =$	Grade 3: Recall addition facts for single-digit numbers and related subtraction facts to develop increasingly efficient mental strategies for computation(VCMNA133) Grade 4: Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153)
F06: Subtraction Algorithm	6. ✎ $784 - 295$	Grade 4: Apply place value to partition, rearrange and regroup numbers to at least tens of thousands to assist calculations and solve problems (VCMNA153)
F07: Mental Multiplication	7. a. half of $20 =$ b. $10 \times 11 =$ c. $4 \times 8 =$ d. $12 \times 11 =$	Grade 4: Recall multiplication facts up to 10 × 10 and related division facts (VCMNA155)
F08: Multiplication Algorithm	8. ✎ 48×15	Grade 5: Solve problems involving multiplication of large numbers by one- or two-digit numbers using efficient mental, written strategies and appropriate digital technologies (VCMNA183)

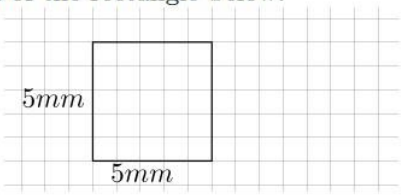
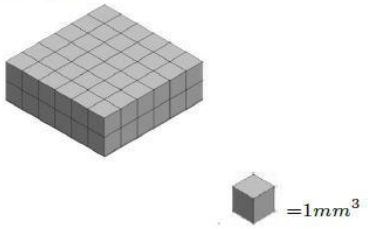
F09: Mental Division	9. a. $40 \div 8 =$ b. $96 \div 8 =$ c. $\frac{6}{3} =$ d. $29 \div 10 =$ rem.	Grade 4: Recall multiplication facts up to 10 × 10 and related division facts (VCMNA155) Grade 5: Solve problems involving division by a one digit number, including those that result in a remainder(VCMNA184)
F10: Division Algorithm	10. ✎ $9531 \div 9$	Grade 5: Solve problems involving division by a one digit number, including those that result in a remainder(VCMNA184)
F11: Order of Operations	11. ✎ Evaluate $\frac{6}{5-2}$	Grade 6: Explore the use of brackets and order of operations to write number sentences (VCMNA220)
F12: Powers and Square Roots	12. a. $5^2 =$ b. $\sqrt{49} =$	Grade 6: Identify and describe properties of prime, composite, square and triangular numbers (VCMNA208) Year 7: Investigate and use square roots of perfect square numbers (VCMNA239)

F13: Adding and subtracting positive integers	13. ✎ Calculate the sum below. Use the number line on the opposite page to illustrate your calculation. $6 - 11 =$	Year 7: Compare, order, add and subtract integers(VCMNA241)
F14: Place Value and Rounding of Decimals	14. a. What is the place value of the 8 in 7.418? b. Round 4.5619 to 2 decimal places (2 dp.)	Grade 5: Recognise that the place value system can be extended beyond hundredths (VCMNA189) Year 7: Round decimals to a specified number of decimal places (VCMNA246)
F15: Factors and Multiples	15. a. List the factors of 53 b. List the first 4 positive multiples of 6	Grade 5: Identify and describe factors and multiples of whole numbers and use them to solve problems(VCMNA181)
F16: Prime Factorisation	16. Write 36 as a product of prime numbers	Year 7: Investigate index notation and represent whole numbers as products of powers of prime numbers(VCMNA238)

F17: Fraction Models	17. What fraction is represented in the diagram below?  	Grade 6: Compare fractions with related denominators and locate and represent them on a number line(VCMNA211)
F18: Adding Fractions with a Common Denominator	18. Calculate $\frac{7}{10} + \frac{2}{10}$. Illustrate your calculation using the rectangle below. $\frac{7}{10} + \frac{2}{10} =$ 	Grade 5: Investigate strategies to solve problems involving addition and subtraction of fractions with the same denominator (VCMNA188)
F19: Fraction of a Number	19. ✎ Compute $\frac{4}{5}$ of 25. Illustrate your calculation using the dual number line. $\frac{4}{5}$ of $25 =$  	Grade 6: Find a simple fraction of a quantity where the result is a whole number, with and without digital technologies(VCMNA213)
F20: Equivalent Fractions	20. Fill in the box to create an equivalent fraction $\frac{5}{9} = \frac{\square}{27}$	Year 7: Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (VCMNA242)
F21: Simplifying Fractions	21. Write the following as a simplified fraction $\frac{60}{96} =$	Year 7: Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (VCMNA242)
F22: Converting Between Mixed and Improper Fractions	22. Write the fraction below as an improper fraction $6\frac{3}{4} =$	Year 7: Compare fractions using equivalence. Locate and represent positive and negative fractions and mixed numbers on a number line (VCMNA242)

F23: Substituting into a One-Step Expression	23. a. ✎ Substitute $x = 9$ into $x + 5$ and evaluate. b. ✎ Substitute $x = 40$ into $\frac{x}{8}$ and evaluate.	Year 7: Create algebraic expressions and evaluate them by substituting a given value for each variable(VCMNA252)
F24: Solving OneStep Equations	24. ✎ Solve the equations below and include working that shows your use of an opposite operation. a. $x - 8 = 7$ b. $\frac{x}{6} = 4$	Year 7: Solve simple linear equations (VCMNA256)

F25: Plotting Coordinates	25. Plot the point $A = (-2, 3)$ below and state the coordinates of point B.  $B = (\quad , \quad)$	Year 7: Given coordinates, plot points on the Cartesian plane, and find coordinates for a given point (VCMNA255)
F26: Estimating and Classifying Angles	26. a. Circle the word that classifies $\angle ABC$ below:  straight right acute obtuse b. $\angle ABC \approx$	Grade 5: Estimate, measure and compare angles using degrees. Construct angles using a protractor(VCMMG202)

F27: Perimeter and Area of a Rectangle	27. ✎ Determine the perimeter and area of the rectangle below.  $P =$ $A =$	Grade 5: Calculate the perimeter and area of rectangles and the volume and capacity of prisms using familiar metric units (VCMMG196)
F28: Volume of a Rectangular Prism	28. ✎ Calculate the volume of the shape below.  $V =$	Grade 5: Calculate the perimeter and area of rectangles and the volume and capacity of prisms using familiar metric units (VCMMG196)
F29: Worded question involving one of the four operations	29. ✎ Kylie walked 4152 steps and Callum walked 2162 in a day. How many more steps did Kylie walk than Callum?	Grade 6: Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers and make estimates for these computations (VCMNA209)

F30: (generally) A multiple choice question assessing the 28 Foundation skills	30. Evaluate $\sqrt{9}$ **A.** 3 **B.** 4.5 **C.** 18 **D.** 81	Year 7: Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.
F31: A worded question that uses the 28 Foundation skill in unfamiliar ways	31. A school has 170 students. 90 of the students each have a book on loan from the library. The fraction of students who have a book on loan from the library is closest to **A.** one-fifteenth **B.** one-eighth **C.** one-quarter **D.** one-half	Year 7: Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.

Core skills:

Skill Code and Descriptor	Sample question	Related Victorian curriculum link(s)
C01 Adding and Subtracting Integers	1. a. $-5+7=$ b. $1--2=$	Year 7: Compare, order, add and subtract integers(VCMNA241)
C02 Properties of Numbers	2. Circle any words that describe the number 5. odd square mult. of 2	Grade 4: Investigate and use the properties of odd and even numbers (VCMNA151) Grade 6: Identify and describe properties of prime, composite, square and triangular numbers (VCMNA208)
C03 Highest Common Factor	3. Determine the highest common factor of 16 and 20.	Grade 5: Identify and describe factors and multiples of whole numbers and use them to solve problems(VCMNA181)

C04 Lowest Common Multiple	4. Determine the lowest common multiple of 7 and 5.	Grade 5: Identify and describe factors and multiples of whole numbers and use them to solve problems(VCMNA181)
C05 Order of operations	5. ✎ Calculate $(7-4)^2$	Grade 6: Explore the use of brackets and order of operations to write number sentences (VCMNA220)

C06 Comparing Decimals	6. Insert $<$, $=$ or $>$ between the decimals and, if possible, circle the biggest decimal. 1.25 1.250	Grade 5: Compare, order and represent decimals (VCMNA190)

<table>
<tr>
<td>C07 Multiplying and Dividing by 10, 100 and 0.1</td>
<td>7. a. $4.48 \times 10 =$

b. $58.58 \div 10 =$</td>
<td>Grade 6:
Multiply and divide decimals by powers of 10 (VCMNA216)

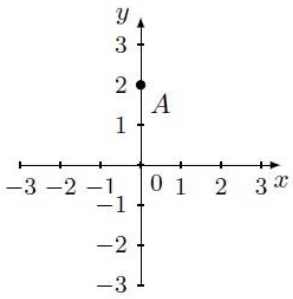
*Note that this skill includes questions involving multiplying and dividing by 0.1</td>
</tr>
<tr>
<td>C08 Converting between Fractions, Percentages and Decimals</td>
<td>8. ✎ Complete the table below
<table><tr><th>P</th><th>F</th><th>D</th></tr><tr><td></td><td>$\frac{23}{25}$</td><td></td></tr></table></td>
<td>Year 7:
Connect fractions, decimals and percentages and carry out simple conversions (VCMNA247)</td>
</tr>
<tr>
<td>C09 Adding and Subtracting Fractions</td>
<td>9. ✎ Calculate $\frac{3}{4} + \frac{5}{16}$</td>
<td>Year 7:
Solve problems involving addition and subtraction of fractions, including those with unrelated denominators(VCMNA243)</td>
</tr>
</table>

C10 Multiplying Fractions	10. ✎ Calculate $\frac{1}{3} \times \frac{4}{6}$	Year 7: Multiply and divide fractions and decimals using efficient written strategies and digital technologies(VCMNA244)

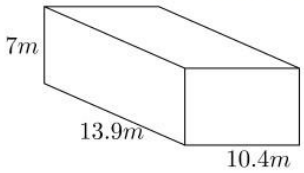
C11 Dividing Fractions	11. ✎ Calculate $\frac{4}{16} \div \frac{10}{8}$	Year 7: Multiply and divide fractions and decimals using efficient written strategies and digital technologies(VCMNA244)
C12 Fraction Arithmetic with Mixed Numbers	12. ✎ Calculate $3\frac{3}{4} \div 2$	Year 7: Solve problems involving addition and subtraction of fractions, including those with unrelated denominators(VCMNA243) Multiply and divide fractions and decimals using efficient written strategies and digital technologies(VCMNA244)

C13 Adding and Subtracting Decimals	13. ✎ Evaluate $2.66 + 0.8$	Grade 6: Add and subtract decimals, with and without digital technologies, and use estimation and rounding to check the reasonableness of answers (VCMNA214)
C14 Multiplying Decimals	14. ✎ Evaluate 4.68×3	Year 7: Multiply and divide fractions and decimals using efficient written strategies and digital technologies(VCMNA244)
C15 Dividing Decimals	15. ✎ Evaluate $0.555 \div 0.3$	Year 7: Multiply and divide fractions and decimals using efficient written strategies and digital technologies(VCMNA244)

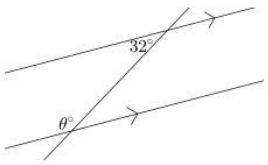
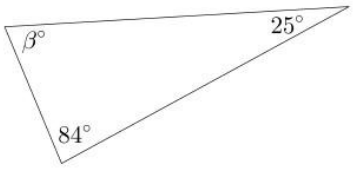
C16 Calculating a Percentage of a Number	16. ✎ Calculate 60% of 26	Year 7: Find percentages of quantities and express one quantity as a percentage of another, with and without digital technologies. (VCMNA248)
C17 Substitution into a 2-step Expression	17. ✎ Substitute $x = 2$ into $3(x + 5)$ and evaluate.	Year 7: Create algebraic expressions and evaluate them by substituting a given value for each variable(VCMNA252)
C18 Solving 2-step Equations with Whole Number Solutions	18. ✎ Solve the following: $49 = 7(x + 3)$	Year 7: Solve simple linear equations (VCMNA256)

C19 Solving Equations involving Integer and Fractional Solutions	19. Solve the following: a. $x + 5 = 4$ b. $9x = 32$	Year 7: Solve simple linear equations (VCMNA256)
C20 Transformation of Points on the Cartesian Plane	20. The point A is rotated 270° anti-clockwise around the origin. Plot A', the image of A, and state its coordinates.  $A' =$	Year 7: Describe translations, reflections in an axis, and rotations of multiples of 90° on the Cartesian plane using coordinates. Identify line and rotational symmetries (VCMMG261)

C21 Completing Coordinates	21. Consider the linear relationship $y = 7x - 2$ Complete the missing value in each coordinate so each satisfies the given relationship. $(6, \quad)$ $(\ , 5)$	Year 7: Create algebraic expressions and evaluate them by substituting a given value for each variable(VCMNA252) Solve simple linear equations (VCMNA256)
C22 Determining Linear Rules	22. The points below follow a rule of the form $y = \square\, x + \square$ x -1 0 1 2 3 4 y 2 8 Complete the rule and table above.	Grade 3: Describe, continue, and create number patterns resulting from performing addition or subtraction(VCMNA138) Use a function machine and the inverse machine as a model to apply mathematical rules to numbers or shapes (VCMNA139) Year 7: Create algebraic expressions and evaluate them by substituting a given value for each variable(VCMNA252) *Note that this skill is well beyond what is expected at a grade 3 level, though when combined with substitution is a more challenging Year 7 skill

C23 Measurement and Conversions	23. a. Circle the units that complete the statement. Most long weekends last for 3__ secs mins hrs days b. 180 min = hr	Grade 6: Convert between common metric units of length, mass and capacity (VCMMG223)
C24 Using Formulas in Measurement	24. ✎ To the nearest whole number, what is the volume the shape below?  $V =$	Year 7: Establish the formulas for areas of rectangles, triangles and parallelograms and use these in problem solving (VCMMG258) Calculate volumes of rectangular prisms(VCMMG259)

C25 Probability and Sample Space	25. a. A bag contains 13 balls numbered 1 to 13. A ball is randomly selected. a. What is the sample space? b. What is the probability of selecting a ball that is a multiple of 5?	Year 7: Construct sample spaces for single-step experiments with equally likely outcomes (VCMSP266) Assign probabilities to the outcomes of events and determine probabilities for events (VCMSP267)

C26 Angles around a point and angles around parallel lines	26. a. Circle the word that classifies the relationship between the angles below.  co-interior corresponding alternating b. What is the value of θ?	Year 7: Identify corresponding, alternate and co-interior angles when two straight lines are crossed by a transversal (VCMMG264)
C27 Angles in a Triangle and Classifying Triangle	27. a. ✎ Calculate the size of angle β  b. Which word(s) classifies the triangle? scalene right isosceles equilateral	Year 7: Demonstrate that the angle sum of a triangle is 180° and use this to find the angle sum of a quadrilateral(VCMMG263) Classify triangles according to their side and angle properties and describe quadrilaterals (VCMMG262)

C28 Statistics	28. Calculate the following statistics for the data set shown in the stem and leaf plot below 0 | 0 7 1 | 7 2 | 4 6 key: 3|4 = 34 3 | 0 1 9 a. range b. mode	Year 7: Construct and compare a range of data displays including stem-and-leaf plots and dot plots(VCMSP269) Calculate mean, median, mode and range for sets of data. Interpret these statistics in the context of data(VCMSP270)

C29: A worded question that uses the 28 Foundation level skill in unfamiliar ways	29. ✎ A school has 170 students. 90 of the students each have a book on loan from the library. The fraction of students who have a book on loan from the library is closest to **A.** one-fifteenth **B.** one-eighth **C.** one-quarter **D.** one-half	Year 7: Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.
C30: (generally) a multiple-choice question that assesses one of the 28 Core level skills	30. The volume of a students' drink bottle is likley to be: **A.** 0.65mL **B.** 650mL **C.** 650L **D.** 650kL	Year 7: Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.
C29: A worded question that uses the 28 Foundation level skill in unfamiliar ways	31. What number will make this equation true? $3.57 + 4.67 = \square + 4.70$	Year 7: Students solve problems involving the order, addition and subtraction of integers. They make the connections between whole numbers and index notation and the relationship between perfect squares and square roots. They solve problems involving all four operations with fractions, decimals, percentages and their equivalences, and express fractions in their simplest form. Students compare the cost of items to make financial decisions, with and without the use of digital technology. They make simple estimates to judge the reasonableness of results. Students use variables to represent arbitrary numbers and connect the laws and properties of number to algebra and substitute numbers into algebraic expressions. They assign ordered pairs to given points on the Cartesian plane and interpret and analyse graphs of relations from real data. Students develop simple linear models for situations, make predictions based on these models, solve related equations and check their solutions.