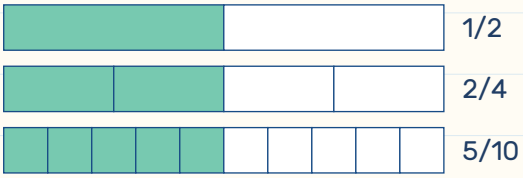
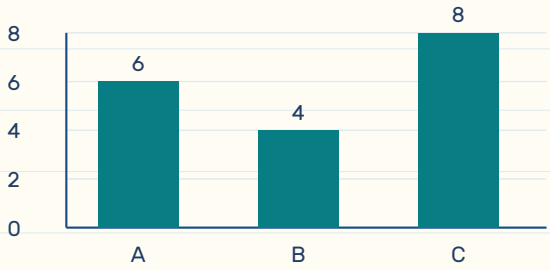
Year 4 Mathematics Quick Revision

Expanded cheatbook

26 topics · 270 short study notes

A worked example under every note





A quick way to revise

1. Find your topic in the contents.

2. Read the short note and follow the worked steps.

3. Cover the answer and try the example yourself.

Use paper for working. Say why each step makes sense.

Expanded from the supplied notebook and website study notes.

Study-note headings checked 1 November 2026.

Find a topic

Every topic takes three pages or fewer.

01	Tenths, hundredths and decimal place value	3-4
02	Multiples and number sequences	5
03	Equivalent fractions and decimals	6-8
04	Counting in fractions	9
05	Multiplying and dividing with tens	10-11
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09	Choosing a mathematical model	20-21
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11	Find the missing number	24-25
12	Multiplication and division connections	26-28
13	Read and compare measurements	29-30
14	Perimeter and area	31-33
15	Time and duration	34-35
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23	Planning a data investigation	49-50
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25	Repeating chance experiments	52-53
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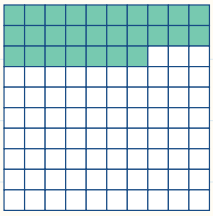
The topic codes on the revision pages link to the matching online study notes. Odd and even numbers is retained from the supplied book. Some supporting notes are added to preserve useful ideas from that book.

Tenths, hundredths and decimal place value

NUMBER / VC2M4N01

01 What decimal number is illustrated?

First decide what counts as one whole. Count complete wholes and shaded tenths or hundredths, then combine them.



27 equal parts of 100 = 0.27

WORKED EXAMPLE

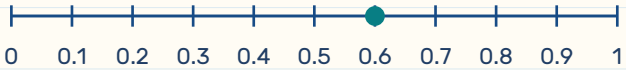
What decimal is 27 shaded squares on a 100-square whole?

1. 27 shaded parts = 27/100.
2. Put 2 in tenths and 7 in hundredths.

0.27

02 Graph decimals on number lines

Find the size of each equal space. Starting at a labelled value, count spaces to place the decimal.



Each space is one tenth.

WORKED EXAMPLE

Plot 0.6 on a 0-to-1 line divided into 10 spaces.

1. One space = 1 ÷ 10 = 0.1.
2. Count six spaces right from 0.

The sixth mark after 0 is 0.6.

03 Decimal number lines

Subtract two labelled values and divide by the number of spaces between them. Add this step size as you move along the line.

WORKED EXAMPLE

A line from 0.20 to 0.30 has 10 spaces; P is 4 spaces after 0.20.

1. One space = 0.10 ÷ 10 = 0.01.
2. P = 0.20 + 0.04.

P = 0.24

04 Understanding decimals expressed in words

Write the whole-number part before the decimal point. Tenths need one decimal place and hundredths need two; use zero to hold an empty place.

WORKED EXAMPLE

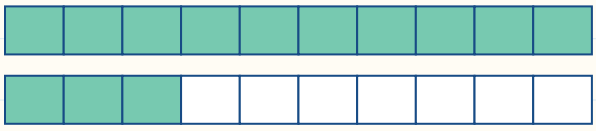
Write two wholes and seven hundredths.

1. Two wholes = 2; seven hundredths = 0.07.
2. Combine: 2 + 0.07.

2.07

05 Model decimals: tenths

Divide each whole into 10 equal parts. Every shaded part is 0.1, so 10 shaded tenths make one whole.



13 tenths = 1 whole + 3 tenths

WORKED EXAMPLE

Two strips show 13 shaded tenths altogether.

1. 13 tenths = 10 tenths + 3 tenths.
2. 1 whole + 0.3 = 1.3.

1.3

Tenths, hundredths and decimal place value

06 Place value models

Put ones, tenths and hundredths in separate columns. Exchange 10 hundredths for 1 tenth, and 10 tenths for 1 whole when needed.

WORKED EXAMPLE

Write 2 wholes, 5 tenths and 14 hundredths.

1. 14 hundredths = 1 tenth + 4 hundredths.

2. 2 wholes + 6 tenths + 4 hundredths.

2.64

07 Place values in decimal numbers

The first place after the point is tenths and the second is hundredths. A digit tells how many parts; its value includes the size of those parts.

Ones	Tenths	Hundredths
3	8	2

3.82 = 3 + 0.8 + 0.02

WORKED EXAMPLE

What is the value of 8 in 3.82?

1. 8 is first after the decimal point.

2. 8 tenths = 8/10.

0.8

08 One-tenth or one-hundredth more or less

Use 0.1 for a tenth and 0.01 for a hundredth. Add for more or subtract for less, keeping the decimal points lined up.

WORKED EXAMPLE

Find one hundredth less than 3.00.

1. Rename 3.00 as 2 wholes and 100 hundredths.

2. 100 hundredths – 1 hundredth = 99 hundredths.

2.99

09 Equivalent decimals

An extra zero at the end of the decimal part leaves the value unchanged. Rename tenths as hundredths to compare matching places.

WORKED EXAMPLE

Are 0.8 and 0.80 equal?

1. 1 tenth = 10 hundredths, so 8 tenths = 80 hundredths.

2. 0.8 = 80/100 = 0.80.

Yes: 0.8 = 0.80.

10 Compare decimals

Line up the decimal points and add ending zeros if useful. Compare ones, then tenths, then hundredths; the first unequal place decides.

WORKED EXAMPLE

Which is larger: 2.6 or 2.57?

1. Write 2.6 as 2.60.

2. Ones match; 6 tenths is more than 5 tenths.

2.6 > 2.57

Multiples and number sequences

NUMBER / VC2M4N02

01 Use a rule to complete a multiplication pattern

Find the stated rule and apply it to every step. A list of multiples often grows by adding the same number each time.

WORKED EXAMPLE

Continue the multiples of 7: 7, 14, 21, __, __.

1. 14 − 7 = 7 and 21 − 14 = 7.

2. 21 + 7 = 28; 28 + 7 = 35.

28, 35

02 What is true about the multiplication pattern?

Test a claim against every shown term. Explain the repeated step or a property shared by the numbers.

WORKED EXAMPLE

What is true of 8, 16, 24, 32?

1. The differences are 8, 8 and 8.

2. The terms are 8 × 1, 8 × 2, 8 × 3 and 8 × 4.

All are multiples of 8.

03 Number sequences

Find the change between neighbouring terms. Add the step to move forwards, subtract it to move backwards, and count the starting term as term 1.

WORKED EXAMPLE

A sequence starts at 15 and adds 6; find term 5.

1. Five terms need 4 jumps.

2. 15 + (4 × 6) = 15 + 24.

Term 5 is 39.

04 Shared multiples

A shared multiple appears in both numbers' multiplication lists. List multiples until a value occurs in both lists.

WORKED EXAMPLE

Find the smallest positive shared multiple of 4 and 6.

1. 4s: 4, 8, 12; 6s: 6, 12.

2. 12 is the first match: 4 × 3 = 6 × 2.

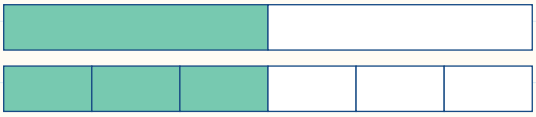
12

Equivalent fractions and decimals

NUMBER / VC2M4N03

01 Find equivalent fractions using area models: two models

Use wholes of equal size. Two fractions are equivalent when their shaded areas match, even if the pieces have different sizes.



WORKED EXAMPLE

One bar has 1 of 2 parts shaded; another has 3 of 6.

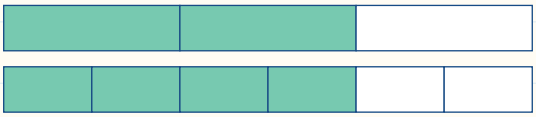
1. Each half becomes 3 sixths.

2. 1/2 = (1 × 3)/(2 × 3) = 3/6.

1/2 = 3/6

02 Find equivalent fractions using area models: one model

Keep the shaded amount fixed and split every part equally. Count the new shaded parts and all the new parts.



WORKED EXAMPLE

A bar shows 2/3; split every third in half.

1. 3 parts become 6; 2 shaded parts become 4.

2. The shaded area stays the same.

2/3 = 4/6

03 Identify equivalent fractions using number lines

Fractions are equivalent when they mark the same position on number lines with matching wholes. Count equal spaces from zero.

WORKED EXAMPLE

Do 1/2 and 2/4 mark the same point?

1. 1 of 2 equal spaces reaches halfway.

2. 2 of 4 equal spaces also reaches halfway.

Yes: 1/2 = 2/4.

04 Find equivalent fractions using number lines

Count how many equal steps make one whole. Rename the marked fraction by multiplying its top and bottom numbers by the same number.

WORKED EXAMPLE

The point 2/3 is relabelled in sixths.

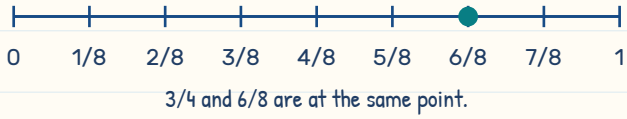
1. 3 × 2 = 6, so double both numbers.

2. 2 × 2 = 4.

2/3 = 4/6

05 Graph equivalent fractions on number lines

Make equal spaces using the denominator, which is the bottom number. Equivalent fractions go on the same mark.



3/4 and 6/8 are at the same point.

WORKED EXAMPLE

Plot 3/4 and 6/8 between 0 and 1.

1. Divide the whole into 8 equal spaces.

2. 3/4 = 6/8, so mark the sixth space from 0.

Both lie at 6/8.

06 Identify equivalent fractions

Multiply or divide the numerator and denominator by the same non-zero number. The fraction still names the same amount.

WORKED EXAMPLE

Is 3/5 equivalent to 9/15?

1. 5 × 3 = 15.

2. 3 × 3 = 9, so both parts use × 3.

Yes: 3/5 = 9/15.

Equivalent fractions and decimals

07 Equivalent fractions: find the missing numerator or denominator

Find the factor connecting the known numbers. Apply that same factor to the other part of the fraction.

WORKED EXAMPLE

Find ? in 3/4 = ?/20.

1. 4 × 5 = 20.

2. 3 × 5 = 15.

? = 15

08 Patterns of equivalent fractions

Build a pattern by multiplying both fraction numbers by 1, 2, 3 and so on. Every fraction must keep the original value.

WORKED EXAMPLE

Continue 2/5, 4/10, 6/15, __.

1. The fractions use × 1, × 2 and × 3.

2. Next use × 4: (2 × 4)/(5 × 4).

8/20

09 Fractions with denominators of 10 and 100

One tenth equals 10 hundredths. Multiply both numbers by 10 to turn a denominator of 10 into 100.

WORKED EXAMPLE

Rename 7/10 in hundredths.

1. 10 × 10 = 100.

2. 7 × 10 = 70.

7/10 = 70/100

10 Write fractions in lowest terms

Divide the top and bottom numbers by a shared factor. Keep dividing until no whole number greater than 1 divides both exactly.

WORKED EXAMPLE

Simplify 12/16.

1. Both numbers divide by 4.

2. 12 ÷ 4 = 3; 16 ÷ 4 = 4.

3/4

11 Graph fractions equivalent to 1 on number lines

When the numerator equals the denominator, all parts of one whole are included. Place the fraction at 1 on the number line.

WORKED EXAMPLE

Where does 5/5 go?

1. Each step is 1/5.

2. Five steps give 5/5 = 1.

At 1

12 Select fractions equivalent to whole numbers using models

Count the equal parts in each whole. If every shown whole is completely shaded, divide the shaded-part count by the parts per whole.

WORKED EXAMPLE

Three whole bars are each split into 4 shaded parts.

1. Shaded parts: 3 × 4 = 12.

2. 12 quarters ÷ 4 quarters per whole = 3 wholes.

12/4 = 3

13 Find fractions equivalent to whole numbers

To write a whole number as a fraction, choose a denominator and multiply the whole number by it for the numerator.

WORKED EXAMPLE

Write 4 as a fraction with denominator 3.

1. 4 wholes need 4 × 3 = 12 thirds.

2. Check: 12 ÷ 3 = 4.

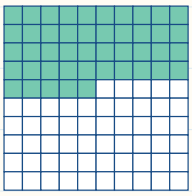
4 = 12/3

Equivalent fractions and decimals

NUMBER / VC2M4N03

14 Model decimals and fractions

A ten-part model shows tenths; a hundred-part model shows hundredths. Count the shaded parts and write both names for the amount.



45/100
= 0.45

WORKED EXAMPLE

A 100-square whole has 45 shaded squares.

1. The fraction is 45/100.

2. 45 hundredths uses two decimal places.

45/100 = 0.45

15 Graph fractions as decimals on number lines

Rename the fraction in tenths or hundredths. Plot the decimal at the same point; the amount does not move.

WORKED EXAMPLE

Plot 3/5 as a decimal.

1. 3/5 = 6/10 by multiplying both numbers by 2.

2. Count six tenth-steps from 0.

3/5 = 0.6

16 Convert fractions and mixed numbers to decimals - denominators of 10 and 100

Keep the whole-number part. Write the fractional part in one decimal place for tenths or two places for hundredths.

WORKED EXAMPLE

Write 3 7/100 as a decimal.

1. 3 stays before the point.

2. 7 hundredths is 0.07; combine 3 + 0.07.

3.07

17 Convert fractions and mixed numbers to decimals

Find an equivalent fraction with denominator 10 or 100. Convert the fraction, then add the whole-number part.

WORKED EXAMPLE

Write 2 3/4 as a decimal.

1. 3/4 = 75/100 = 0.75.

2. 2 + 0.75 = 2.75.

2.75

18 Convert decimals to fractions and mixed numbers

Write decimal digits over 10 for tenths or 100 for hundredths. Keep any whole-number part and simplify the fraction.

WORKED EXAMPLE

Write 1.25 as a mixed number.

1. 1.25 = 1 25/100.

2. 25/100 = 1/4 by dividing both numbers by 25.

1 1/4

19 Compare fractions

Use the same-sized whole and rename fractions with a common denominator. Then compare the numerators: more equal-sized parts means more.

WORKED EXAMPLE

Which is greater: 2/3 or 5/6?

1. 2/3 = 4/6.

2. 4 sixths is less than 5 sixths.

5/6 is greater.

20 Find a fraction of an amount

Divide the amount by the denominator to find one equal share. Multiply that share by the numerator if you need several shares.

WORKED EXAMPLE

Find 3/4 of 20 counters.

1. One quarter: 20 ÷ 4 = 5.

2. Three quarters: 3 × 5 = 15.

15 counters

Counting in fractions

NUMBER / VC2M4N04

01 Count equal fraction parts across wholes

Keep every part the same size as you count past 1. The denominator tells how many parts make one whole.

WORKED EXAMPLE

Count seven half-sized pieces.

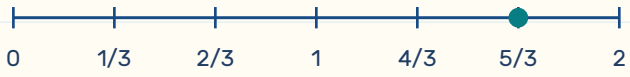
1. Two halves make each whole.

2. 7 halves = 6 halves + 1 half = 3 wholes + 1 half.

7/2 = 3 1/2

02 Count number-line steps in halves, thirds and quarters

Split every whole-number interval into 2, 3 or 4 equal spaces. Move right to add fraction steps and left to subtract them.



Each whole is split into three equal spaces.

WORKED EXAMPLE

Start at 1 and move forward 2 thirds.

1. 1 = 3/3.

2. 3/3 + 2/3 = 5/3.

5/3 = 1 2/3

03 Name whole and mixed-number positions

Count complete wholes first, then the extra fraction parts. A mixed number combines a whole number with a fraction smaller than 1.

WORKED EXAMPLE

What position is 11 quarter-steps after 0?

1. 11 = 2 × 4 + 3.

2. Eight quarters make 2 wholes, leaving 3 quarters.

11/4 = 2 3/4

04 Count backwards in fractions

Keep the denominator and subtract the number of equal steps. Rename whole numbers in the needed fraction parts before counting backwards.

WORKED EXAMPLE

Start at 2 and move back 3 quarters.

1. 2 = 8/4.

2. 8/4 – 3/4 = 5/4.

1 1/4

05 Mixed numbers to improper fractions

Multiply the whole number by the denominator, then add the numerator. Keep the same denominator because the part size has not changed.

WORKED EXAMPLE

Rename 2 2/3 as an improper fraction.

1. 2 wholes = 2 × 3 = 6 thirds.

2. 6 thirds + 2 thirds = 8 thirds.

8/3

Multiplying and dividing with tens

NUMBER / VC2M4N05

01 Multiplication patterns over increasing place values

Use the small multiplication fact, then name the size of its units. Multiplying a factor by 10 makes its product 10 times as large.

WORKED EXAMPLE

Use 6 × 4 = 24 to find 6 × 400.

1. 400 is 4 hundreds.

2. 6 × 4 hundreds = 24 hundreds.

2,400

02 Multiply by a multiple of ten using place value

A multiple of ten can be renamed as a number of tens. Multiply the tens, then convert them back to ones.

WORKED EXAMPLE

Find 7 × 30.

1. 30 is 3 tens.

2. 7 × 3 tens = 21 tens.

210

03 Multiply by a multiple of ten

Split the multiple of ten into a small factor and 10. Multiply by the small factor first, then by 10.

WORKED EXAMPLE

Find 14 × 20.

1. 14 × 2 = 28.

2. 28 × 10 = 280.

280

04 Multiply numbers ending in zeros

Separate each number into its non-zero factor and place-value factor. Multiply the parts, keeping track of tens and hundreds.

WORKED EXAMPLE

Find 40 × 300.

1. 40 × 300 = 4 × 3 × 10 × 100.

2. 12 × 1,000 = 12,000.

12,000

05 Multiply numbers ending in zeros: word problems

Multiply the number of equal groups by the amount in each group. Use place value to calculate, then name what the answer counts.

WORKED EXAMPLE

There are 30 boxes with 20 crayons in each.

1. 30 × 20 = 3 × 2 × 100.

2. 6 × 100 = 600.

600 crayons

06 Division patterns over increasing place values

Use a known division fact with larger units. With the same divisor, a total 10 times as large gives an answer 10 times as large.

WORKED EXAMPLE

Use 42 ÷ 7 = 6 to find 4,200 ÷ 7.

1. 4,200 is 42 hundreds.

2. 42 hundreds ÷ 7 = 6 hundreds.

600

07 Divide by multiples of ten

For division by a multiple of 10, divide both numbers by 10 first. This changes the unit being counted but keeps the quotient the same.

WORKED EXAMPLE

Find 720 ÷ 30.

1. 720 ÷ 30 = 72 ÷ 3.

2. 72 ÷ 3 = 24; check 24 × 30 = 720.

24

Multiplying and dividing with tens

NUMBER / VC2M4N05

08 Divide numbers ending in zeros: word problems

Decide whether you need the number of groups or the amount in each group. Divide the total and check by multiplying.

WORKED EXAMPLE

Share 1,600 stickers equally among 8 classes.

1. 16 hundreds ÷ 8 = 2 hundreds.

2. Check: 8 × 200 = 1,600.

200 stickers per class

09 Multiply by 10, 100 or 1,000

In a place-value chart, move each digit left 1 place for × 10, 2 for × 100, or 3 for × 1,000. The decimal point stays in its fixed position.

WORKED EXAMPLE

Find 34 × 100.

1. Move 3 tens to 3 thousands and 4 ones to 4 hundreds.

2. 3,000 + 400 = 3,400.

3,400

10 Divide by 10, 100 or 1,000

Move each digit right 1 place for ÷ 10, 2 for ÷ 100, or 3 for ÷ 1,000 in a place-value chart. Each move makes the digit's value ten times smaller.

WORKED EXAMPLE

Find 4,500 ÷ 100.

1. Move 4 thousands to 4 tens and 5 hundreds to 5 ones.

2. 40 + 5 = 45.

45

Strategies for the four operations

NUMBER / VC2M4N06

01 Addition place-value patterns

Add equal-sized units, then rename the total.

Example: Find 3,000 + 5,000.

3 thousands + 5 thousands = 8 thousands.

Answer: 8,000

02 Add up to five digits

Line up places and add, regrouping when needed.

Example: Find 24,860 + 13,270.

24,860 + 13,000 = 37,860; + 270 = 38,130.

03 Five-digit addition stories

Add the amounts being combined, keeping their units.

Example: Two towns have 12,480 and 15,620 people.

12,480 + 15,000 + 620 = 28,100.

Answer: 28,100 people

04 Add three or more numbers

Pair friendly numbers first; use every number once.

Example: Find 12,750 + 8,400 + 2,250.

12,750 + 2,250 = 15,000; + 8,400 = 23,400.

05 Missing addend

Subtract the known part from the total.

Example: 12,600 + ? = 20,000.

20,000 − 12,600 = 7,400; check 12,600 + 7,400 = 20,000.

Answer: ? = 7,400

06 Choose a given sum

Subtract a candidate from the target to find its partner.

Example: Which pair from 35, 45, 65 totals 100?

100 − 35 = 65; 35 + 65 = 100.

Answer: 35 and 65

07 Addition input/output tables

Add the rule amount to each input.

Example: Rule: + 25; input: 68.

68 + 20 + 5 = 93.

Answer: Output: 93

08 Subtraction place-value patterns

Subtract equal-sized units without changing their order.

Example: Find 9,000 − 4,000.

9 thousands − 4 thousands = 5 thousands.

Answer: 5,000

09 Subtract up to five digits

Subtract a nearby round amount, then return the extra.

Example: Find 30,004 − 8,256.

30,004 − 8,300 = 21,704; + 44 = 21,748.

10 Five-digit subtraction stories

Subtract what leaves from the starting amount.

Example: A store has 15,350 books and sells 2,780.

15,350 − 2,000 − 700 − 80 = 12,570.

Answer: 12,570 books remain

11 Missing subtraction number

Find the missing start by adding the removed amount back.

Example: ? − 2,450 = 6,300.

6,300 + 2,450 = 8,750.

Answer: ? = 8,750

12 Choose a given difference

Test larger minus smaller against the target difference.

Example: Which pair from 42, 58, 73 differs by 31?

73 − 42 = 31.

Answer: 73 and 42

13 Subtraction input/output tables

Subtract the same rule amount from each input.

Example: Rule: − 18; input: 64.

64 − 10 − 8 = 46.

Answer: Output: 46

14 Multiply by tens

Count tens first, then rename them as ones.

Example: Find 13 × 40.

13 × 4 tens = 52 tens = 520.

15 Teen multiplication grids

Split the teen into ten and ones.

Example: Find 6 × 14.

6 × (10 + 4) = 60 + 24 = 84.

16 Choose a two-digit area model

Check that the pieces reconstruct both original side lengths.

Example: Choose a model for 4 × 23.

Sides: 4 and (20 + 3); areas: 80 + 12 = 92.

Answer: Use 4 × 20 and 4 × 3.

Strategies for the four operations

17 Use a two-digit area model

Multiply the tens and ones separately, then add.

Example: Find 7 × 32.

(7 × 30) + (7 × 2) = 210 + 14 = 224.

18 Choose a larger area model

Split by place value and include every non-zero part.

Example: Choose a model for 3 × 1,204.

1,204 = 1,000 + 200 + 4; areas: 3,000 + 600 + 12.

Answer: Three parts total 3,612.

19 Use a larger area model

Find each small rectangle's area, then total them.

Example: Find 4 × 312.

(4 × 300) + (4 × 10) + (4 × 2) = 1,248.

20 Choose a two-by-two-digit model

Split both factors; every pair of parts needs a rectangle.

Example: Choose a model for 12 × 23.

(10 + 2) × (20 + 3): 200 + 30 + 40 + 6.

Answer: Four parts total 276.

21 Use a two-by-two-digit model

Multiply every pair of tens and ones, then add.

Example: Find 14 × 22.

(10 × 20) + (10 × 2) + (4 × 20) + (4 × 2) = 308.

22 One digit × two digits

Split the two-digit number into easier parts.

Example: Find 6 × 27.

(6 × 20) + (6 × 7) = 120 + 42 = 162.

23 Two-digit multiplication stories

Multiply the number of equal groups by each group's size.

Example: Five bags each hold 24 marbles.

5 × 24 = 100 + 20 = 120.

Answer: 120 marbles

24 Multiply using expanded form

Expand the number into place values and multiply each.

Example: Find 3 × 2,041.

3 × (2,000 + 40 + 1) = 6,000 + 120 + 3.

Answer: 6,123

25 One-digit partial products

Write one product per place, then add those products.

Example: Find 4 × 326.

4 × 300 = 1,200; 4 × 20 = 80; 4 × 6 = 24.

Answer: 1,200 + 80 + 24 = 1,304

26 One digit × three/four digits

Multiply every place-value part and combine the answers.

Example: Find 5 × 1,216.

(5 × 1,200) + (5 × 16) = 6,000 + 80.

Answer: 6,080

27 Larger multiplication stories

Multiply the groups by the amount in each group.

Example: Four buses each travel 235 km.

4 × 235 = 800 + 120 + 20 = 940.

Answer: 940 km altogether

28 One digit × larger numbers

Use the same place-value method with every larger place.

Example: Find 3 × 12,040.

3 × (12,000 + 40) = 36,000 + 120.

Answer: 36,120

29 Multiplication input/output tables

Multiply every input by the stated factor.

Example: Rule: × 6; input: 14.

14 × 6 = 60 + 24 = 84.

Answer: Output: 84

30 Two-digit partial products

Split both factors and add all four smaller products.

Example: Find 23 × 15.

(20 + 3) × (10 + 5) = 200 + 100 + 30 + 15 = 345.

31 Build from a known fact

Adjust the product to match the change in its factor.

Example: Use 7 × 8 = 56 to find 7 × 9.

One extra group of 7: 56 + 7 = 63.

32 Divide with arrays

Arrange the total into equal rows and count each row.

Example: Arrange 48 dots in 4 rows.

4 rows of 10 use 40; 8 left give 2 more per row.

Answer: 48 ÷ 4 = 12

Strategies for the four operations

NUMBER / VC2M4N06

33 Two-digit division area models

Split the total into areas divisible by the known side.

Example: Find 84 ÷ 4.

(80 ÷ 4) + (4 ÷ 4) = 20 + 1.

Answer: 21

34 Repeated subtraction

Subtract equal groups and count how many groups you remove.

Example: Find 24 ÷ 6.

24 – 6 – 6 – 6 – 6 = 0: four groups.

35 Three-digit division area models

Choose easy areas that add to the total.

Example: Find 156 ÷ 3.

(150 ÷ 3) + (6 ÷ 3) = 50 + 2.

Answer: 52

36 Partial quotients

Remove convenient multiples of the divisor; add the group counts.

Example: Find 168 ÷ 6.

168 – 120 = 48 (20 groups); 48 ÷ 6 = 8 groups.

Answer: 20 + 8 = 28

37 Two digits ÷ one digit

Share divisible parts, then check any leftover remainder.

Example: Find 67 ÷ 3.

60 ÷ 3 = 20; 7 ÷ 3 = 2 remainder 1.

Answer: 22 remainder 1

38 Complete a two-digit division table

Divide each row's total by its stated divisor.

Example: Complete: 96 ÷ 4 = ?.

(80 ÷ 4) + (16 ÷ 4) = 20 + 4.

Answer: 24

39 Three/four digits ÷ one digit

Divide easy parts; check by multiplying, using a calculator if helpful.

Example: Find 1,248 ÷ 4.

(1,200 ÷ 4) + (48 ÷ 4) = 300 + 12.

Answer: 312

40 Complete a larger division table

Keep each dividend with its divisor and divide.

Example: Complete: 1,575 ÷ 5 = ?.

(1,500 ÷ 5) + (75 ÷ 5) = 300 + 15.

Answer: 315

41 Division input/output tables

Use division forwards and multiplication to find a missing input.

Example: Rule: ÷ 7; output: 12; input: ?.

12 × 7 = 84; check 84 ÷ 7 = 12.

Answer: Input: 84

42 Two-digit division stories

Divide equally, then interpret any remainder in the story.

Example: Pack 53 apples into bags of 5.

53 = (10 × 5) + 3.

Answer: 10 full bags; 3 apples left

43 Larger division stories

Share the total equally and include the unit.

Example: Share 1,260 cards among 6 classes.

(1,200 ÷ 6) + (60 ÷ 6) = 200 + 10.

Answer: 210 cards per class

44 Mental addition/subtraction with zeros

Count tens or hundreds first, then restore the unit.

Example: Find 460 + 280 – 120.

46 tens + 28 tens – 12 tens = 62 tens.

Answer: 620

45 Connect multiplication and division

Use multiplication to undo division and check the missing factor.

Example: Find ? in 96 ÷ ? = 8.

8 × ? = 96; 96 ÷ 8 = 12.

Answer: ? = 12

46 Mixed operations

Do brackets, then × and ÷, then + and –; work left to right within each pair.

Example: Find (18 + 6) ÷ 4.

18 + 6 = 24; 24 ÷ 4 = 6.

47 Choose numbers meeting conditions

Test the same pair against every given condition.

Example: Two numbers multiply to 24 and differ by 2.

6 × 4 = 24; 6 – 4 = 2.

Answer: 6 and 4

48 Multiplication and division stories

Write the operations in the order the story needs.

Example: Share 4 packs of 18 pencils among 6 children.

4 × 18 = 72; 72 ÷ 6 = 12.

Answer: 12 pencils each

Rounding and sensible estimates

NUMBER / VC2M4N07

01 Rounding

Find the two neighbouring multiples of the requested place value. Choose the nearer one; for these positive numbers, choose the higher one at halfway.

WORKED EXAMPLE

Round 36,742 to the nearest hundred.

1. Neighbours: 36,700 and 36,800; halfway: 36,750.

2. 36,742 is below halfway.

36,700

02 Round decimals

Find the requested decimal place and look one place to its right. A digit from 5 to 9 rounds up; a digit from 0 to 4 leaves that place unchanged.

WORKED EXAMPLE

Round 4.76 to the nearest tenth.

1. The tenths digit is 7; the hundredths digit is 6.

2. Round 7 tenths up to 8 tenths.

4.8

03 Round to the nearest five cents

Find the 5-cent amounts immediately below and above the total. Choose the closer amount when cash rounding is requested.

WORKED EXAMPLE

Round $7.43 to the nearest 5c.

1. Nearby amounts: $7.40 and $7.45.

2. $7.43 is 3c from $7.40 and 2c from $7.45.

$7.45

04 Round to the nearest five cents: word problems

Add exact prices first and round the final cash total once. Rounding each item can give a different total.

WORKED EXAMPLE

Two items cost $2.32 and $3.81; round the total to 5c.

1. $2.32 + $3.81 = $6.13.

2. $6.13 is closer to $6.15 than $6.10.

$6.15 cash total

05 Round to the nearest dollar or more

Read the requested unit before rounding. Use nearby multiples of $1, $10 or the stated amount and choose the nearest.

WORKED EXAMPLE

Round $34.80 to the nearest $10.

1. Nearby amounts: $30 and $40; halfway: $35.

2. $34.80 is below $35.

$30

06 Round decimals to the nearest whole number

Compare the decimal with its neighbouring whole numbers. A fractional part of 0.5 or more rounds up; less than 0.5 rounds down.

WORKED EXAMPLE

Round 8.67 to the nearest whole number.

1. 8.67 lies between 8 and 9.

2. It is above halfway, 8.5.

9

Rounding and sensible estimates

NUMBER / VC2M4N07

07 Estimate sums

Round the addends to the requested place, then add. Use “about” to show that the answer is an estimate.

WORKED EXAMPLE

Estimate 386 + 214 to the nearest hundred.

1. 386 rounds to 400; 214 rounds to 200.

2. 400 + 200 = 600.

About 600

08 Estimate sums: word problems

Find the amounts being combined and round them as instructed. Add the rounded amounts and keep the story’s unit.

WORKED EXAMPLE

A library has 1,486 fiction and 2,432 non-fiction books; estimate to hundreds.

1. 1,486 becomes 1,500; 2,432 becomes 2,400.

2. 1,500 + 2,400 = 3,900.

About 3,900 books

09 Estimate differences

Round both numbers as instructed. Keep the subtraction order and subtract the rounded values.

WORKED EXAMPLE

Estimate 792 – 318 using hundreds.

1. 792 rounds to 800; 318 rounds to 300.

2. 800 – 300 = 500.

About 500

10 Estimate differences: word problems

Identify the starting amount and the amount removed or compared. Round them, then subtract to estimate the difference.

WORKED EXAMPLE

A 1,965 m route has 738 m completed; estimate metres left using hundreds.

1. 1,965 becomes 2,000; 738 becomes 700.

2. 2,000 – 700 = 1,300.

About 1,300 m left

11 Estimate products: multiply by one-digit numbers

Round the larger factor as requested and keep the one-digit factor exact. Multiply to find an approximate product.

WORKED EXAMPLE

Estimate 68 × 4 by rounding 68 to tens.

1. 68 rounds to 70.

2. 70 × 4 = 280.

About 280

12 Estimate products: word problems

Multiply the number of groups by a rounded amount per group. Keep a small, exact group count unchanged unless told otherwise.

WORKED EXAMPLE

Six packs have 48 stickers each; estimate using tens.

1. 48 rounds to 50.

2. 6 × 50 = 300.

About 300 stickers

Rounding and sensible estimates

13 Estimate products: multiply by two-digit numbers

Round both factors to the stated place. Multiply the easier values and label the result as approximate.

WORKED EXAMPLE

Estimate 38 × 62 using tens.

1. 38 rounds to 40; 62 rounds to 60.

2. 40 × 60 = 2,400.

About 2,400

14 Estimate to compare quotients

Use nearby totals that divide easily to compare divisions. If the estimates tie or are close, check the exact answers.

WORKED EXAMPLE

Which is larger: 196 ÷ 4 or 126 ÷ 3?

1. 200 ÷ 4 = 50; 120 ÷ 3 = 40, suggesting the first.

2. Exact check: 196 ÷ 4 = 49; 126 ÷ 3 = 42.

196 ÷ 4 is larger.

15 Estimate quotients: word problems

Choose a nearby total that divides easily by the number of groups. Divide it and keep “about” with the answer.

WORKED EXAMPLE

Estimate 358 beads shared by 6 children.

1. Use 360 because 36 divides by 6.

2. 360 ÷ 6 = 60.

About 60 beads each

16 Estimate sums, differences, products and quotients: word problems

Choose the operation that matches the story before rounding. Use nearby friendly numbers and keep all the needed steps.

WORKED EXAMPLE

Estimate the cost of 4 tickets at $19 and a $12 snack.

1. Round $19 to $20 and keep $12.

2. 4 × $20 + $12 = $92.

About $92

17 Multi-step word problems: identify reasonable answers

Estimate each stage without leaving out any groups or extras. Compare the estimate with the proposed answer to catch a large error.

WORKED EXAMPLE

Five boxes hold 198 tiles each, plus 23 loose tiles; is 10,013 reasonable?

1. 5 × 200 + 20 = about 1,020.

2. Exact total: 5 × 198 + 23 = 1,013.

No; the correct total is 1,013 tiles.

18 Use bounds to check a budget

For a positive total, rounding every price up gives a high estimate. This can help you allow enough money; an estimate alone does not prove an exact answer.

WORKED EXAMPLE

Will $30 cover 6 items at $4.70 each?

1. Each item is below $5, so 6 items cost below 6 × $5 = $30.

2. Exact cost: 6 × $4.70 = $28.20.

Yes; $1.80 remains.

Prices, payments and change

NUMBER / VC2M4N08

01 Round to the nearest five cents

When cash rounding is requested, choose the nearest amount ending in 0c or 5c. Round the final total only.

WORKED EXAMPLE

Round $8.67 to the nearest 5c.

1. $8.65 is 2c away; $8.70 is 3c away.

2. Choose the closer amount.

$8.65

02 Round to the nearest five cents: word problems

Add all prices before rounding the total to the nearest 5c. Keep exact cents for a card-payment question.

WORKED EXAMPLE

A drink is $2.42 and a snack is $3.46; find the cash total.

1. $2.42 + $3.46 = $5.88.

2. $5.88 is closer to $5.90 than $5.85.

$5.90 cash total

03 Add and subtract money amounts: up to $1

Work in cents for small amounts. Add to combine costs and subtract to find what remains; 100c makes $1.

WORKED EXAMPLE

You have 90c and buy items for 35c and 20c.

1. Total spent: 35c + 20c = 55c.

2. Money left: 90c – 55c = 35c.

35c remains

04 Add and subtract money amounts

Write two cents digits and line up the decimal points. Add dollars to dollars and cents to cents, exchanging 100c for $1 when needed.

WORKED EXAMPLE

Find $12.60 – $4.85.

1. $12.60 – $4.00 = $8.60.

2. $8.60 – $0.85 = $7.75.

$7.75

05 Add and subtract money amounts: word problems

Decide whether to combine prices or find their difference. To compare prices, subtract the cheaper amount from the dearer amount.

WORKED EXAMPLE

A red bag is $18.75 and a blue bag is $14.40; how much more is red?

1. $18.75 – $14.40 = $4.35.

2. Check: $14.40 + $4.35 = $18.75.

$4.35 more

06 Find the change, price or amount paid

Use paid = price + change. Subtract to find a missing price or change, and add to find the amount paid.

WORKED EXAMPLE

You pay $20 and receive $6.35 change; find the price.

1. Price = $20.00 – $6.35 = $13.65.

2. Check: $13.65 + $6.35 = $20.00.

$13.65

Prices, payments and change

NUMBER / VC2M4N08

07 Price lists with addition and subtraction

Choose only the listed items needed and include each quantity. Add their costs, then subtract from a budget or payment if asked.

Pen	Notebook	Ruler
$2.20	$4.50	$1.80

WORKED EXAMPLE

Pen $2.20; notebook $4.50; ruler $1.80: buy pen and notebook from $10.

1. Cost: $2.20 + $4.50 = $6.70.
2. Money left: $10.00 – $6.70 = $3.30.

$3.30 remains

08 Estimate to the nearest 10c

Find the neighbouring multiples of 10c. Choose the nearer one; at exactly 5c halfway, round up for these positive amounts.

WORKED EXAMPLE

Round $6.25 to the nearest 10c.

1. Neighbours: $6.20 and $6.30.
2. $6.25 is exactly halfway, so round up.

$6.30

Choosing a mathematical model

NUMBER / VC2M4N09

01 Addition, subtraction, multiplication and division word problems

Read what is happening: join amounts (+), find a difference (-), count equal groups (×), or share/group (÷). Sketch the story and label the answer.

WORKED EXAMPLE

Share 32 stickers equally among 4 children. How many each?

1. Sharing equally means divide: 32 ÷ 4 = 8.
2. Check: 4 × 8 = 32 stickers.

8 stickers each

02 Word problems with extra or missing information

Keep facts that help answer the question and ignore unrelated details. If an essential fact is missing, name it before calculating.

WORKED EXAMPLE

Five blue bags hold equal numbers of marbles. What fact is missing to find the total?

1. Total = 5 × marbles in one bag.
2. The colour does not tell us how many marbles.

We need the number of marbles in each bag.

03 Solve word problems using guess-and-check

Try a sensible number, calculate, and compare with the target. Use that result to improve your next guess and check every condition.

WORKED EXAMPLE

Bags hold 4 shells each; 2 shells are loose. How many bags make 22 shells altogether?

1. Try 4 bags: 4 × 4 + 2 = 18, too few.
2. Try 5 bags: 5 × 4 + 2 = 22.

5 bags

04 Multi-step word problems

Break the story into smaller calculations in the order needed. Keep the result of each step and answer the original question with its unit.

WORKED EXAMPLE

Buy 3 notebooks at $4 each and pay $20. Find the change.

1. Cost: 3 × $4 = $12.
2. Change: $20 - $12 = $8.

$8 change

05 Add and subtract money amounts: up to $1

For small amounts, work in cents. Remember that 100 cents equals $1, and use two decimal places when writing dollars.

WORKED EXAMPLE

Find $0.65 - $0.25.

1. 65 cents - 25 cents = 40 cents.
2. 40 cents = $0.40.

$0.40

06 Add and subtract money amounts

Line up dollars and cents for addition or subtraction. For a mental shortcut, use a nearby whole dollar and then correct the extra amount.

WORKED EXAMPLE

Find $3.45 + $1.95 mentally.

1. Add $2 instead: $3.45 + $2.00 = $5.45.
2. That is 5 cents too much: $5.45 - $0.05 = $5.40.

$5.40

Choosing a mathematical model

NUMBER / VC2M4N09

07 Add and subtract money amounts: word problems

Add to find a combined cost; subtract to compare costs or find what remains. Decide from the story, then check the answer in dollars and cents.

WORKED EXAMPLE

A book costs $6.80; a pen costs $2.35. How much more is the book?

1. Difference: $6.80 - $2.35 = $4.45.
2. Check: $2.35 + $4.45 = $6.80.

$4.45 more

08 Find the change, price or amount paid

Payment = payable cost + change. Subtract either known part from the payment to find the other part; use the final cash total when cash rounding applies.

WORKED EXAMPLE

A purchase costs $7.60 and the change is $2.40. How much was paid?

1. Payment: $7.60 + $2.40 = $10.00.
2. Check: $10.00 - $7.60 = $2.40.

$10.00 paid

09 Price lists with addition and subtraction

Add the selected prices to find their total. To find a missing price, subtract all known prices from the total.

WORKED EXAMPLE

Three items total $9.50; two cost $3.20 and $2.10. Find the third price.

1. Known prices: $3.20 + $2.10 = $5.30.
2. Missing price: $9.50 - $5.30 = $4.20.

$4.20

Number patterns and algorithms

NUMBER / VC2M4N10

01 Input/output tables with addition, subtraction, multiplication and division

An input is the starting number; the output is the result. Apply every operation in the stated order, using the same rule for each row.

WORKED EXAMPLE

The rule is × 3, then - 2. Find the output for input 5.

1. First: 5 × 3 = 15.
2. Then: 15 - 2 = 13.

13

02 Use a rule to complete a multiplication pattern

Start with the given number and multiply by the stated factor each time. Record the start as the first term and stop when instructed.

WORKED EXAMPLE

Start at 2 and multiply by 3. Write four terms.

1. Term 1 is 2; then 2 × 3 = 6.
2. 6 × 3 = 18; 18 × 3 = 54.

2, 6, 18, 54

03 Recognise and apply number-pattern rules

To test a multiplying rule, divide a term by the term before it. Check that the same factor works for every step.

WORKED EXAMPLE

What rule fits 3, 6, 12, 24?

1. 6 ÷ 3 = 2 and 12 ÷ 6 = 2.
2. Check: 24 ÷ 12 = 2.

Multiply by 2 each time.

04 Number sequences

Follow the start, repeated rule and stopping condition in order. Count changes carefully: five recorded terms need only four changes.

WORKED EXAMPLE

Start at 4; add 5; stop before passing 20.

1. 4 + 5 = 9; 9 + 5 = 14.
2. 14 + 5 = 19; the next value, 24, is above 20.

4, 9, 14, 19

05 Complete an increasing number pattern

Find the gaps between neighbouring terms. If the gaps follow a rule, find the next gap before finding the next term.

WORKED EXAMPLE

Continue 2, 5, 10, 17 using gaps that increase by 2.

1. Gaps: +3, +5, +7; the next gap is +9.
2. 17 + 9 = 26.

26

06 Complete a geometric number pattern

A geometric pattern multiplies by the same factor each time. Multiply to move forwards or divide to move backwards.

WORKED EXAMPLE

Complete 5, 10, __, 40 using × 2.

1. 10 × 2 = 20.
2. Check the next step: 20 × 2 = 40.

20

Number patterns and algorithms

NUMBER / VC2M4N10

07 Number patterns: word problems

Identify the first amount and what changes each time. Match the term number to the event, day or stage in the story.

WORKED EXAMPLE

A display has 6 stars on day 1 and gains 4 each day. How many on day 4?

1. Day 4 is three changes after day 1.

2. 6 + 4 + 4 + 4 = 18.

18 stars

08 Number patterns: mixed review

Read the rule before calculating: it may add, subtract, multiply, divide or combine operations. Check each new number against the whole rule.

WORKED EXAMPLE

Start at 3 and repeat × 2, then + 1. Find the next two terms.

1. 3 × 2 + 1 = 7.

2. 7 × 2 + 1 = 15.

7, 15

09 Identify mistakes in number patterns

Check the changes from the beginning and find the first one that breaks the rule. Correct it, then use the corrected value for later terms.

WORKED EXAMPLE

The rule is + 6: 5, 11, 17, 24, 30. Fix the list.

1. 17 + 6 = 23, so 24 is the first mistake.

2. Continue from 23: 23 + 6 = 29.

5, 11, 17, 23, 29

Find the missing number

ALGEBRA / VC2M4A01

01 Properties of addition

Addition lets you swap the order or regroup the addends without changing their total. Adding zero leaves the number unchanged.

WORKED EXAMPLE

Find (18 + 7) + 3 using an easy pair.

1. Regroup: 18 + (7 + 3).

2. 7 + 3 = 10, so 18 + 10 = 28.

28

02 Complete the addition number sentence

The equals sign means the two sides have equal value. Find a missing addend by subtracting the known part from the total, then substitute it to check.

WORKED EXAMPLE

Solve 36 + □ = 81.

1. □ = 81 - 36 = 45.

2. Check: 36 + 45 = 81.

□ = 45

03 Complete the subtraction number sentence

Missing start = amount taken away + amount left. Missing amount taken away = start - amount left; check the completed subtraction.

WORKED EXAMPLE

Solve □ - 27 = 35.

1. Find the start: 35 + 27 = 62.

2. Check: 62 - 27 = 35.

□ = 62

04 Complete the addition or subtraction number sentence - up to 100

First locate the blank: is it a total, a starting amount or a missing part? Use addition or subtraction to find it, then check both sides.

WORKED EXAMPLE

Solve 84 - □ = 49.

1. The missing amount taken away is 84 - 49 = 35.

2. Check: 84 - 35 = 49.

□ = 35

05 Balance addition equations

Calculate the complete side first. Subtract the known addend on the other side to find what makes both totals equal.

WORKED EXAMPLE

Solve 26 + 34 = 19 + □.

1. Left total: 26 + 34 = 60.

2. Missing part: 60 - 19 = 41; 19 + 41 = 60.

□ = 41

Find the missing number

ALGEBRA / VC2M4A01

06 Balance subtraction equations

Find the value of the complete side. Use that value as the result needed on the side with the blank.

WORKED EXAMPLE

Solve 73 - 28 = 60 - □.

1. Left side: 73 - 28 = 45.

2. 60 - 45 = 15; check: 60 - 15 = 45.

□ = 15

07 Balance addition and subtraction equations - up to 100

The two sides can use different operations and still be equal. Calculate the complete side, solve the missing part, then compare both sides.

WORKED EXAMPLE

Solve 24 + □ = 70 - 18.

1. Right side: 70 - 18 = 52.

2. □ = 52 - 24 = 28; check: 24 + 28 = 52.

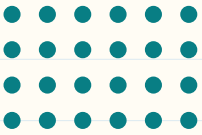
□ = 28

Multiplication and division connections

ALGEBRA / VC2M4A02

01 Multiplication facts for 2, 3, 4, 5 and 10

Multiply to count equal groups. Use doubles for × 2, double again for × 4, and skip-count for × 3, × 5 or × 10.



4 rows of 6
= 24

WORKED EXAMPLE

Find 4 × 6.

1. Double 6: 12.

2. Double 12: 24.

24

02 Multiplication facts for 6, 7, 8 and 9

Build a tricky fact from an easier fact. For × 9, multiply by 10 and subtract one group.

WORKED EXAMPLE

Find 9 × 7.

1. 10 × 7 = 70.

2. 70 - 7 = 63.

63

03 Multiplication facts to 10

Practise facts with factors from 1 to 10. Swap the factors to use a fact you already know.

WORKED EXAMPLE

Find 7 × 4.

1. Swap: 7 × 4 = 4 × 7.

2. 4 × 7 = 28.

28

04 Use strip models to solve multiplication word problems

Draw a bar split into equal boxes, one for each group. Write the group size in every box and multiply.

WORKED EXAMPLE

Three packs contain 8 cards each. Find the total.

1. Bar: [8] [8] [8].

2. 3 × 8 = 24.

24 cards

05 Multiplication facts to 10: word problems

Find the number of equal groups and the number in each. Multiply them and name what your answer counts.

WORKED EXAMPLE

Six tables have 5 children each. How many children?

1. 6 groups of 5 means 6 × 5.

2. 6 × 5 = 30.

30 children

06 Multiplication facts to 10: find the missing factor

A factor is a number being multiplied. Divide the product by the known factor to find the missing one.

WORKED EXAMPLE

Solve 8 × □ = 56.

1. 56 ÷ 8 = 7.

2. Check: 8 × 7 = 56.

□ = 7

Multiplication and division connections

ALGEBRA / VC2M4A02

07 Multiplication word problems: find the missing factor up to 10

Write an equal-groups equation with a blank for the missing group size or number of groups. Use division to fill the blank.

WORKED EXAMPLE

Forty-two flowers fill 6 equal bunches. How many in each?

1. $6 \times \square = 42$; $42 \div 6 = 7$.

2. Check: $6 \times 7 = 42$.

7 flowers

08 Properties of multiplication

Swapping factors or regrouping them keeps the product unchanged. Multiplying by 1 keeps a number; multiplying by 0 gives 0.

WORKED EXAMPLE

Find $5 \times 3 \times 2$ efficiently.

1. Regroup as $(5 \times 2) \times 3$.

2. $10 \times 3 = 30$.

30

09 Distributive property: find the missing factor

Split one factor into parts and multiply every part by the other factor. Add the products; the parts must rebuild the original factor.

WORKED EXAMPLE

Complete $7 \times 6 = (5 \times 6) + (\square \times 6)$.

1. $7 = 5 + 2$, so $\square = 2$.

2. Check: $30 + 12 = 42 = 7 \times 6$.

$\square = 2$

10 Compare numbers using multiplication

Calculate each product before choosing <, > or =. Compare the answers, rather than just the factors.

WORKED EXAMPLE

Compare 6×7 and 5×9.

1. $6 \times 7 = 42$; $5 \times 9 = 45$.

2. $42 < 45$.

$6 \times 7 < 5 \times 9$

11 Choose numbers with a particular product

A factor pair contains two whole numbers that multiply to the target product. Test a pair by multiplying.

WORKED EXAMPLE

Choose two numbers from 3, 4, 6, 7 with product 24.

1. Try 4 and 6: $4 \times 6 = 24$.

2. Both numbers are in the list.

4 and 6

12 Choose the multiples of a given number up to 10

A multiple is a number reached by multiplying by a whole number. Skip-count or divide to check whether a number fits.

WORKED EXAMPLE

Which of 18, 20 and 24 are multiples of 6?

1. $6 \times 3 = 18$; $6 \times 4 = 24$.

2. 20 is between these multiples.

18 and 24

13 Division facts for 2, 3, 4, 5 and 10

Use a times-table fact to undo division. Ask which number, multiplied by the divisor, gives the total.

WORKED EXAMPLE

Find $35 \div 5$.

1. $5 \times 7 = 35$.

2. So $35 \div 5 = 7$.

7

Multiplication and division connections

ALGEBRA / VC2M4A02

14 Division facts for 6, 7, 8 and 9

Connect division by 6, 7, 8 or 9 to the matching multiplication fact. Multiply your answer by the divisor to check.

WORKED EXAMPLE

Find 72 ÷ 8.

1. 8 × 9 = 72.

2. So 72 ÷ 8 = 9.

9

15 Division facts to 10

One multiplication fact gives two related division facts. The product becomes the starting total in each division.

WORKED EXAMPLE

Use 6 × 9 = 54 to find 54 ÷ 9.

1. 54 split into 9 equal groups gives 6 each.

2. Check: 9 × 6 = 54.

6

16 Division facts to 10: find the missing number

For a missing total, multiply divisor by quotient. For a missing divisor, divide the total by the quotient; check the original sentence.

WORKED EXAMPLE

Solve □ ÷ 7 = 8.

1. Missing total: 7 × 8 = 56.

2. Check: 56 ÷ 7 = 8.

□ = 56

17 Division facts to 10: word problems

Division can find the size of equal shares or the number of equal groups. Keep the answer unit matched to the question.

WORKED EXAMPLE

Pack 48 muffins into boxes of 6. How many boxes?

1. 48 ÷ 6 = 8.

2. Check: 8 boxes × 6 muffins = 48 muffins.

8 boxes

18 Properties of division

With the divisor unchanged, adding one whole group increases the quotient by 1. Dividing by 1 leaves a number unchanged; division by 0 is not defined.

WORKED EXAMPLE

Use 24 ÷ 6 = 4 to find 30 ÷ 6.

1. 30 = 24 + 6: one extra group of 6.

2. 4 + 1 = 5 groups.

5

19 Choose numbers with a particular quotient

The quotient is the answer to division. Choose a total that equals the target quotient multiplied by the divisor.

WORKED EXAMPLE

Choose a total from 28, 35, 42 so total ÷ 7 = 5.

1. 5 × 7 = 35.

2. Check: 35 ÷ 7 = 5.

35

20 Multiplication and division facts to 10: true or false?

Calculate each side separately before deciding if a statement is true. A related multiplication fact can check a division.

WORKED EXAMPLE

Is 48 ÷ 6 = 3 × 3 true?

1. Left side: 48 ÷ 6 = 8.

2. Right side: 3 × 3 = 9; 8 ≠ 9.

False

Read and compare measurements

MEASUREMENT / VC2M4M01

01 Read a thermometer

Temperature is measured in degrees Celsius (°C). Find the value of one gap between marks, then count to the top of the liquid.

WORKED EXAMPLE

There are 5 equal gaps from 10°C to 20°C. The liquid reaches 3 gaps above 10°C.

1. One gap: (20 - 10) ÷ 5 = 2°C.

2. Reading: 10 + 3 × 2 = 16°C.

16°C

02 Reasonable temperature

Use the situation and any given range to judge whether a temperature makes sense. Compare readings using the same unit.

WORKED EXAMPLE

The task says a room should be 18°C to 24°C. Choose 8°C, 21°C or 35°C.

1. 21 is between 18 and 24.

2. 8 is below the range; 35 is above it.

21°C

03 Which metric unit is appropriate?

Choose the quantity first: length (mm, cm, m, km), mass (g, kg), liquid volume (mL, L) or temperature (°C). Choose a unit whose size suits the object.

WORKED EXAMPLE

Which unit suits the mass of an apple: g, km or L?

1. Mass measures how heavy the apple is.

2. Grams measure a small mass; km measures length and L measures volume.

Grams (g)

04 Measure using a centimetre ruler

Align one end with the zero mark, not the ruler edge. If the object starts elsewhere, subtract its starting reading from its ending reading.

WORKED EXAMPLE

A ribbon runs from the 2 cm mark to the 9 cm mark. Find its length.

1. End reading - start reading = 9 - 2.

2. 9 - 2 = 7 cm.

7 cm

05 Compare metric units of length

Convert lengths to the same unit before comparing. Use 1 cm = 10 mm, 1 m = 100 cm and 1 km = 1,000 m.

WORKED EXAMPLE

Which is longer: 1.3 m or 125 cm?

1. 1.3 m = 130 cm.

2. 130 cm > 125 cm, by 5 cm.

1.3 m is longer.

06 Compare metric units of mass

Use 1 kg = 1,000 g to write both masses in grams or kilograms. Compare the matching units.

WORKED EXAMPLE

Which is heavier: 1.2 kg or 950 g?

1. 1.2 kg = 1,200 g.

2. 1,200 g > 950 g.

1.2 kg is heavier.

Read and compare measurements

MEASUREMENT / VC2M4M01

07 Compare metric units of volume

Use 1 L = 1,000 mL to compare liquid volumes. Rename both amounts in the same unit before comparing or subtracting.

WORKED EXAMPLE

How much more is 1.5 L than 900 mL?

1. 1.5 L = 1,500 mL.

2. 1,500 - 900 = 600 mL.

600 mL more

08 Map distances

A map scale matches a map length to a real distance. Multiply the measured map length by the distance represented by one centimetre.

WORKED EXAMPLE

A map uses 1 cm for 2 km. A route is 4 cm long. Find the real distance.

1. 4 × 2 = 8 km.

2. Check: 8 ÷ 2 = 4 cm on the map.

8 km

09 Choose tools and read digital scales

Use a ruler or tape for length, scales for mass, a jug for liquid volume and a thermometer for temperature. Read the unit on a digital display before comparing the number.

WORKED EXAMPLE

A digital scale shows 1.25 kg; how many grams is that?

1. 1 kg = 1,000 g; 0.25 kg = 250 g.

2. 1,000 + 250 = 1,250 g.

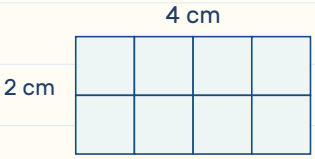
1,250 g

Perimeter and area

MEASUREMENT / VC2M4M02

01 Perimeter of figures on grids

Perimeter is the distance around the outside edge. Count boundary lengths on the grid once each; ignore lines inside the shape.



WORKED EXAMPLE

A rectangle is 4 squares long and 2 wide; each square side is 1 cm.

1. Outside lengths: 4, 2, 4, 2 cm.

2. 4 + 2 + 4 + 2 = 12 cm.

Perimeter = 12 cm

02 Perimeter of rectangles

A rectangle has two matching lengths and two matching widths. Add all four sides, or double length + width.

WORKED EXAMPLE

Find the perimeter of a 7 cm by 3 cm rectangle.

1. Length + width: 7 + 3 = 10 cm.

2. Double: 2 × 10 = 20 cm.

20 cm

03 Perimeter of polygons

A polygon is a closed shape with straight sides. Add every outside side, using one common length unit.

WORKED EXAMPLE

A triangle has sides 4 cm, 5 cm and 6 cm. Find its perimeter.

1. 4 + 5 = 9 cm.

2. 9 + 6 = 15 cm.

15 cm

04 Find the perimeter of polygons

Trace the boundary before adding so you include every side. For a polygon with equal side lengths, multiply one side by the number of sides.

WORKED EXAMPLE

A regular hexagon has six 3 cm sides. Find its perimeter.

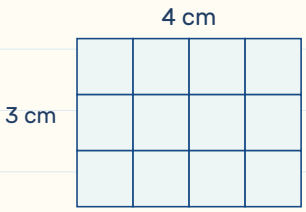
1. There are 6 equal sides.

2. 6 × 3 = 18 cm.

18 cm

05 Create figures with a given area

Use equal square tiles and arrange the required number with no gaps or overlaps. Rows × squares per row must match the target area.



WORKED EXAMPLE

Make a rectangle of area 12 cm² using 1 cm² tiles.

1. Choose 3 rows with 4 tiles in each.

2. 3 × 4 = 12 tiles, covering 12 cm².

A 4 cm by 3 cm rectangle

Perimeter and area

MEASUREMENT / VC2M4M02

06 Find the area of figures made of unit squares

Area measures the surface inside a shape. Count each equal unit square once and write square units.

WORKED EXAMPLE

A shape has rows of 4, 4 and 2 unit squares. Find its area.

1. Count row by row: 4 + 4 + 2.

2. Total = 10 unit squares.

10 square units

07 Select figures with a given area

Calculate each area before choosing. For rectangles, multiply length by width and compare with the requested area.

WORKED EXAMPLE

Which rectangle has area 18 cm²: 3 cm × 6 cm or 4 cm × 5 cm?

1. 3 × 6 = 18 cm².

2. 4 × 5 = 20 cm².

The 3 cm × 6 cm rectangle

08 Select two figures with the same area

Shapes can look different but cover the same area. Compare their counts of equal square units or their calculated areas.

WORKED EXAMPLE

Compare rectangles 2 cm × 8 cm and 4 cm × 4 cm.

1. 2 × 8 = 16 cm².

2. 4 × 4 = 16 cm².

Both have area 16 cm².

09 Area of figures on grids

Count full squares and combine known partial squares. When parts are only approximately full or half squares, label the result as an estimate.

WORKED EXAMPLE

A shape covers 6 full squares and 4 exact half-squares; each full square is 1 cm².

1. 4 halves make 2 whole squares.

2. 6 + 2 = 8 cm².

8 cm²

10 Tile a rectangle and find the area

Cover the rectangle completely with equal square tiles. Count the tiles and multiply by the area of one tile if it is not one square unit.

WORKED EXAMPLE

A rectangle holds 3 rows of 4 tiles; each tile covers 4 cm².

1. Tiles: 3 × 4 = 12.

2. Area: 12 × 4 = 48 cm².

48 cm²

11 Multiply to find the area of a rectangle made of unit squares

Rows × squares in each row counts all the squares quickly. If every square is 1 cm², this total is the area in cm².

WORKED EXAMPLE

A rectangle has 5 rows of 6 one-centimetre squares. Find the area.

1. 5 × 6 = 30 squares.

2. Each covers 1 cm², so 30 × 1 = 30 cm².

30 cm²

Perimeter and area

MEASUREMENT / VC2M4M02

12 Find the area or missing side length of a rectangle

Rectangle area = length × width. To find a missing side, divide the area by the known side and use a length unit.

WORKED EXAMPLE

A rectangle has area 24 cm² and length 6 cm. Find the width.

1. Width: 24 ÷ 6 = 4 cm.
2. Check: 6 cm × 4 cm = 24 cm².

4 cm

13 Area and perimeter word problems

Use perimeter for something around an edge, such as a fence. Use area for covering a surface, such as grass or tiles.

WORKED EXAMPLE

A 5 m by 4 m garden needs fencing around all sides. How much?

1. Fencing follows the edge, so find perimeter.
2. 5 + 4 + 5 + 4 = 18 m.

18 m of fencing

Time and duration

MEASUREMENT / VC2M4M03

01 Convert time units

Use 60 seconds = 1 minute, 60 minutes = 1 hour and 24 hours = 1 day. Multiply to change to smaller units; divide to change to larger units.

WORKED EXAMPLE

Change 2 h 25 min to minutes.

1. 2 × 60 = 120 minutes.

2. 120 + 25 = 145 minutes.

145 min

02 Add and subtract mixed time units

Add or subtract matching time units. Exchange 60 minutes for 1 hour, or 1 hour for 60 minutes, when needed.

WORKED EXAMPLE

Find 2 h 10 min - 45 min.

1. Rename 2 h 10 min as 1 h 70 min.

2. 70 - 45 = 25 min; keep the 1 hour.

1 h 25 min

03 Fractions of time units

Write the whole time in a smaller unit. Divide by the denominator, then multiply by the numerator.

WORKED EXAMPLE

Find 3/4 of an hour.

1. One hour is 60 min; one quarter is 60 ÷ 4 = 15 min.

2. Three quarters: 15 × 3 = 45 min.

45 min

04 A.M. or P.M.

am runs from midnight to before noon; pm runs from noon to before midnight. Remember 12 am is midnight and 12 pm is noon.

WORKED EXAMPLE

A lesson begins at 11:45 am and lasts 30 minutes. Is the finish am or pm?

1. 15 minutes reaches 12 noon.

2. Another 15 minutes reaches 12:15 pm.

12:15 pm

05 Elapsed time

Elapsed time is the duration between start and finish. Jump to a whole hour, then to the finishing time, and add the jumps.



WORKED EXAMPLE

Find the time from 9:40 am to 10:25 am.

1. 9:40 to 10:00 = 20 min.

2. 10:00 to 10:25 = 25 min; 20 + 25 = 45 min.

45 min

06 Find the end time: word problems

Finishing time = starting time + duration. Add in easy jumps and check whether you pass noon or midnight.

WORKED EXAMPLE

A movie starts at 2:35 pm and lasts 50 minutes. When does it finish?

1. Add 25 min to reach 3:00 pm.

2. Add the remaining 25 min.

3:25 pm

Time and duration

MEASUREMENT / VC2M4M03

07 Find the start time: word problems

Starting time = finishing time - duration. Count backwards, then add the duration to check your answer.

WORKED EXAMPLE

A lesson ends at 4:10 pm after 45 minutes. When did it start?

1. Back 10 min reaches 4:00 pm.

2. Back another 35 min reaches 3:25 pm.

3:25 pm

08 Find the elapsed time: word problems

Mark the start and finish in the correct order on a timeline. Count across each hour, including noon or midnight when needed.

WORKED EXAMPLE

A trip begins at 11:50 am and ends at 12:35 pm. How long is it?

1. 11:50 am to noon = 10 min.

2. Noon to 12:35 pm = 35 min; total 10 + 35 = 45 min.

45 min

09 Find the start time, the end time or the elapsed time: word problems

Identify which of start, finish or duration is missing. Add for the finish, subtract for the start, or count between times for the duration.

WORKED EXAMPLE

Training starts at 5:20 pm and lasts 1 h 15 min. Find the missing finish.

1. 5:20 pm + 1 h = 6:20 pm.

2. 6:20 pm + 15 min = 6:35 pm.

6:35 pm

10 Find start and end times: multi-step word problems

Include every activity, travel period and break in the correct order. Keep a running time on a timeline to avoid missing a step.

WORKED EXAMPLE

Start at 9:15 am, work 40 min, break 10 min, then work 25 min. Find the finish.

1. 9:15 + 40 min = 9:55 am; + 10 min = 10:05 am.

2. 10:05 + 25 min = 10:30 am.

10:30 am

11 Transportation schedules

Read the correct route, stop and time column. Compare departure and arrival times, allowing for any wait or transfer.

WORKED EXAMPLE

A bus leaves at 8:10 am and arrives at 8:45 am; the next bus leaves at 8:55 am. Find travel and waiting time.

1. First trip: 8:10 to 8:45 = 35 min.

2. Wait: 8:45 to 8:55 = 10 min.

35 min travelling; 10 min waiting

12 Read 24-hour time

In 24-hour time, midnight is 00:00 and noon is 12:00. For pm hours from 1 to 11, add 12 to the hour; leave the minutes unchanged.



3:45 pm = 15:45

WORKED EXAMPLE

Write 3:45 pm in 24-hour time.

1. 3 + 12 = 15.

2. Keep 45 minutes, so write 15:45.

15:45

Angles and turns

MEASUREMENT / VC2M4M04

01 Angles greater than, less than or equal to a right angle

A right angle is 90°, like a square corner. Compare the size of the opening, not the length or direction of its arms.

WORKED EXAMPLE

Is a 65° angle smaller or larger than a right angle, and by how much?

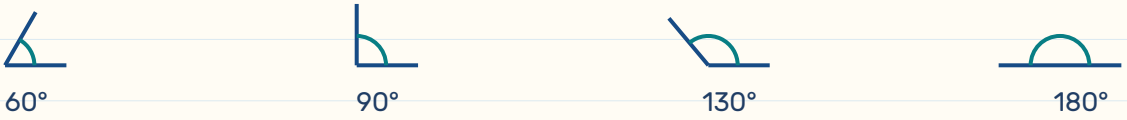
1. 65° is less than 90°.

2. 90° - 65° = 25°.

25° smaller than a right angle

02 Acute, right, obtuse and straight angles

Acute: between 0° and 90°; right: 90°; obtuse: between 90° and 180°; straight: 180°. Reflex angles are between 180° and 360°; a full turn is 360°.



60° 90° 130° 180°

WORKED EXAMPLE

Name an angle of 130°.

1. 130° is more than 90° and less than 180°.

2. It fits the obtuse-angle range.

Obtuse

03 Estimate angle measurements

Use benchmark turns: a quarter is 90°, a half is 180°, and a full turn is 360°. Compare the marked opening with these benchmarks to estimate its size.

WORKED EXAMPLE

An opening is about halfway between 90° and 180°. Estimate it.

1. The gap is 180° - 90° = 90°; half is 45°.

2. 90° + 45° = 135°.

About 135°

Shapes and objects

SPACE / VC2M4SP01

01 Which two-dimensional figure is being described?

Count the straight sides, then check equal lengths and angles. Choose the most exact name that fits every clue; turning a shape does not change its name.

WORKED EXAMPLE

A flat shape has 3 equal sides; what is it?

1. Three sides make a triangle.

2. All three sides are equal, so it is equilateral.

An equilateral triangle.

02 Is it a polygon?

A polygon is a flat, closed shape made entirely of straight sides. Trace its outline to check for gaps or curves.

WORKED EXAMPLE

Is a semicircle a polygon?

1. Its outline is closed.

2. Part of the boundary is curved, so it fails the straight-side test.

No, a semicircle is not a polygon.

03 Number of sides in polygons

Start at one corner and count each outside side once. Triangle = 3 sides, quadrilateral = 4, pentagon = 5, hexagon = 6 and octagon = 8.

WORKED EXAMPLE

How many more sides has an octagon than a pentagon?

1. An octagon has 8 sides; a pentagon has 5.

2. 8 - 5 = 3.

The octagon has 3 more sides.

04 Sides and angles of quadrilaterals

Every quadrilateral has 4 sides. A rectangle has 4 right angles, a rhombus has 4 equal sides, and a square has both; here a trapezium has exactly one pair of parallel sides.

WORKED EXAMPLE

Name a quadrilateral with 4 equal sides and no right angles.

1. Four equal sides fit a rhombus.

2. Without right angles, it cannot be a square.

A rhombus.

05 Identify three-dimensional figures

A 3D object has length, width and depth. Identify it by its flat faces and curved surfaces: a sphere is all curved, while a cylinder has two circular faces and a curved surface.

WORKED EXAMPLE

What shape is a smooth ball?

1. It has one curved surface.

2. It has no flat faces or corners.

A sphere.

06 Count vertices, edges and faces

A face is flat, an edge is a join and a vertex is a corner. Count each feature once, including hidden ones; keep curved surfaces separate from flat faces.

WORKED EXAMPLE

Count the faces, edges and vertices of a square-based pyramid.

1. Faces: 1 square + 4 triangles = 5.

2. Edges: 4 base + 4 sloping = 8; vertices: 4 base + 1 top = 5.

5 faces, 8 edges and 5 vertices.

Shapes and objects

SPACE / VC2M4SP01

07 Identify faces of three-dimensional figures

Look at the flat surfaces and name their 2D shapes. Count matching end faces and side faces separately, then add them.

WORKED EXAMPLE

Which faces make a triangular prism?

1. There are 2 matching triangular ends.
2. There are 3 rectangular side faces: 2 + 3 = 5.

2 triangles and 3 rectangles; 5 faces in all.

08 Which three-dimensional figure is being described?

Read every clue about faces, corners and curved surfaces before naming a solid. A prism has two matching parallel ends; a pyramid has triangular faces meeting at one top vertex.

WORKED EXAMPLE

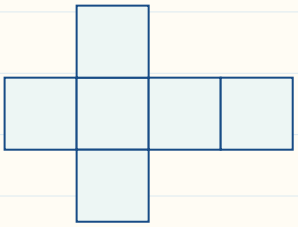
An object has 1 square base and 4 triangular faces meeting at a point; name it.

1. The side triangles meet at one point, so it is a pyramid.
2. The base is a square.

A square-based pyramid.

09 Nets of three-dimensional figures

A net is a flat pattern that folds into a 3D object. Check the face shapes and their joins: every face must fit without a gap or an overlap.



WORKED EXAMPLE

Can the cross-shaped pattern of 6 squares fold into a cube?

1. Fold the four squares in a row around the sides.
2. Fold the attached squares over the top and bottom; all 6 faces close.

Yes, this is a cube net.

10 Compare properties of two-dimensional shapes

Compare the same feature in both shapes, such as side count, equal sides or right angles. Use subtraction to find the difference between counts.

WORKED EXAMPLE

Compare the sides and right angles of a square and a rectangle that is not a square.

1. Both have 4 sides and 4 right angles.
2. The square has 4 equal sides; the other rectangle has only opposite sides equal.

Same side and angle counts; different side-length pattern.

Shapes and objects

SPACE / VC2M4SP01

11 Compare properties of three-dimensional objects

Make separate counts for faces, edges and vertices in each solid. Compare matching features, rather than a face count with an edge count.

WORKED EXAMPLE

How many more vertices has a cube than a triangular prism?

1. Cube: 8 vertices; triangular prism: 6 vertices.

2. 8 - 6 = 2.

A cube has 2 more vertices.

12 Compare two-dimensional and three-dimensional properties

Use sides and angles to describe flat 2D shapes. Use faces, surfaces, edges and vertices to describe 3D objects, which also have depth.

WORKED EXAMPLE

How are a circle and a cylinder different?

1. A circle is a flat 2D shape.

2. A cylinder is 3D and has 2 circular faces joined by a curved surface.

A circle is 2D; a cylinder is 3D.

Making shapes from parts

SPACE / VC2M4SP02

01 Which two-dimensional figure is being described?

Name the smaller shapes, then trace the outside of the combined shape. Lines where pieces meet are inside, so they do not become extra outside sides.

WORKED EXAMPLE

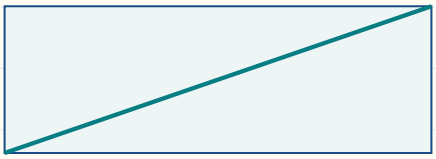
Join two equal squares along a whole side; what is the outside shape?

1. Place the squares side by side with no overlap.
2. The outside has 4 right angles; its length is twice its width.

A rectangle.

02 Compose two-dimensional shapes

Check the sides and angles of the gap before choosing a piece. Slide, turn or flip a piece so that it fits with no overlap and no space left.



WORKED EXAMPLE

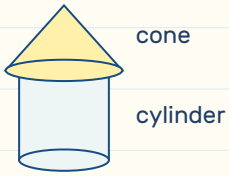
A rectangle is cut along one diagonal; what pieces rebuild it?

1. The cut makes 2 matching right-angled triangles.
2. Join their longest sides to restore the rectangle.

Two matching right-angled triangles.

03 Build a model from solid shapes

Break a real object into its main parts and match each part to a familiar solid. A simple model keeps the important shape without copying every detail.



WORKED EXAMPLE

Which two solids could model a pointed tower?

1. Use a cylinder for the tall body.
2. Place a cone on top for the pointed roof.

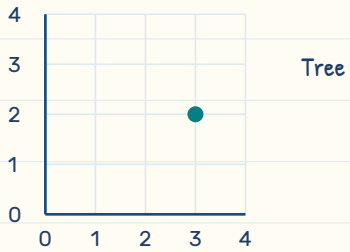
A cylinder with a cone on top.

Maps and grid references

SPACE / VC2M4SP03

01 Objects on a coordinate plane

Coordinates name a point: read the horizontal position first, then the vertical position. For (x, y), go across x units and up y units from (0, 0), checking the scale.



WORKED EXAMPLE

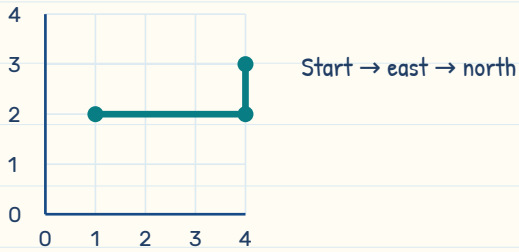
Place a tree at (3, 2).

1. From (0, 0), move 3 units right.
2. Move 2 units up and mark the grid-line intersection.

The tree is at (3, 2).

02 Coordinate planes as maps

Follow each move in order and check the map scale and north arrow. When north is up, east increases the first coordinate and north increases the second; letter references such as B2 name squares instead.



WORKED EXAMPLE

Start at (1, 2), go 3 units east, then 1 unit north.

1. East: (1 + 3, 2) = (4, 2).
2. North: (4, 2 + 1) = (4, 3).

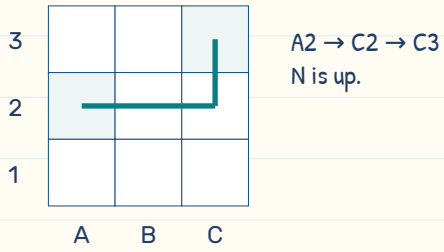
Finish at (4, 3).

Maps and grid references

SPACE / VC2M4SP03

03 Read and follow letter-grid references

A letter-grid reference names a square: read the column letter first and then the row number. With north at the top, move right for east, left for west, up for north and down for south.



A2 → C2 → C3
N is up.

WORKED EXAMPLE

Start in A2; move 2 squares east and 1 square north.

1. Two squares east: A2 to B2 to C2.
2. One square north: C2 to C3.

Finish in square C3.

04 Make a clear grid map

Label the rows and columns, draw a north arrow and add a key explaining your symbols. Place each object carefully so someone else can find it from its reference.

WORKED EXAMPLE

Design a map with a playground in B1 and a tree in C2.

1. Draw and label a grid with columns A–C and rows 1–3.
2. Put a slide symbol in B1 and a tree symbol in C2; explain both in the key.

A labelled map with a key and north arrow.

Symmetry

SPACE / VC2M4SP04

01 Identify lines of symmetry

A mirror line divides a design into halves that match exactly when folded. Check the outside and all inside details, not just whether the halves have equal areas.

WORKED EXAMPLE

Is a diagonal a mirror line of a rectangle that is not a square?

1. Imagine folding on the diagonal.
2. The long and short sides do not lie exactly on each other.

No, that diagonal is not a line of symmetry.

02 Draw lines of symmetry

Draw a possible fold through the shape, then check that matching points are equally far from it. For a reflected drawing, put each matching point the same distance on the opposite side.



WORKED EXAMPLE

A dot is 2 grid squares left of a vertical mirror line; where is its reflection?

1. Count 2 squares straight across to the line.
2. Count 2 more squares to the right, keeping the same height.

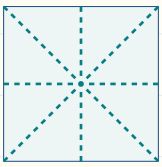
2 squares right of the line, at the same height.

Symmetry

SPACE / VC2M4SP04

03 Count lines of symmetry

Test vertical, horizontal and diagonal folds, counting each working line once. Only folds that match the whole design count.



WORKED EXAMPLE

How many mirror lines does an undecorated square have?

1. The middle vertical and horizontal folds give 2 lines.

2. Both diagonals also work: 2 + 2 = 4.

4 lines of symmetry.

04 Rotational symmetry

Turn a shape around its centre and look for an exact match before a full turn. Rotational order counts the matches in 360°; the smallest turn is 360° divided by the order. Order 1 means there is no match before a full turn.

WORKED EXAMPLE

Find the rotational order and smallest turn of an undecorated square.

1. It matches at 90°, 180°, 270° and 360°: 4 matches.

2. 360° ÷ 4 = 90°.

Order 4; smallest turn 90°.

Reading and making data displays

STATISTICS / VC2M4ST01

Topic page 1 of 2

01 Read picture graphs

Read the key before counting pictures. Multiply the number of pictures by the value of one picture; only use part-pictures when the key explains them.

Books ★ ★ ★ ★

Key: 1 star = 3 books

WORKED EXAMPLE

A pictograph shows 4 stars; each star means 3 books. How many books?

1. There are 4 symbols, each worth 3.

2. 4 × 3 = 12.

12 books.

02 Make picture graphs

Choose a clear key, then divide each count by the value of one symbol. Add a title and category labels, and check that the symbols give the correct total.

WORKED EXAMPLE

Show 15 votes with a key of 1 circle = 5 votes.

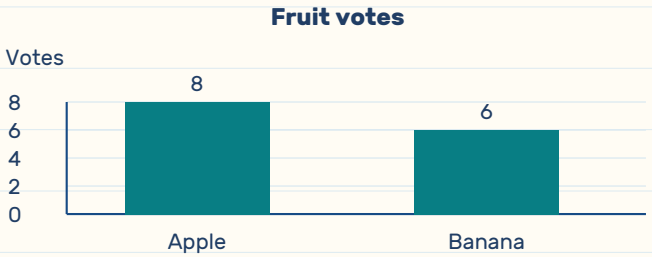
1. 15 ÷ 5 = 3.

2. Draw 3 circles beside the category and write the key.

3 circles show 15 votes.

03 Read column graphs

Read the title, labels and equal scale steps before finding a column height. Add values for a total and subtract them for a difference.



WORKED EXAMPLE

A graph shows 8 apple votes and 6 banana votes; how many more chose apple?

1. Read the two heights: 8 and 6 votes.

2. 8 - 6 = 2.

2 more votes for apple.

04 Make column graphs

Give the graph a title and labelled axes, with equal scale steps starting at zero. Draw equal-width columns with gaps, and match each height to its count.

WORKED EXAMPLE

Draw a column for 10 votes when each scale step means 2 votes.

1. 10 ÷ 2 = 5 scale steps.

2. Draw the column up to 10, five steps above zero.

A column reaching 10 votes.

Reading and making data displays

STATISTICS / VC2M4ST01

05 Read a table

Read the headings to see what each column means. Find the correct row, then read across to the required value.

WORKED EXAMPLE

The table says red: 7, blue: 9, green: 4; how many chose blue?

1. Find the row labelled blue.
2. Read its count, which is 9.

9 chose blue.

06 Interpret frequency tables

Frequency means how often a response occurs. Add the needed frequencies once each, then check the total against the number of responses.

WORKED EXAMPLE

A frequency table shows walk: 6, bus: 5, car: 9; how many responses?

1. 6 + 5 = 11.
2. 11 + 9 = 20.

20 responses.

07 Interpret frequency tables with numerical data

A data value tells you the recorded number; its frequency tells you how many records have that number. Keep these two meanings separate.

WORKED EXAMPLE

Six children report pet counts of 0, 2, 1, 2, 3, 2; what is the frequency of 2 pets?

1. Find each 2 in the list.
2. There are three 2s.

Frequency = 3 children.

08 Collect clear records with a digital tool

Use a form or spreadsheet with one clear question and one record for each intended response. Categories are names, while discrete numerical data counts whole items; avoid collecting unnecessary personal details.

WORKED EXAMPLE

How would you record how many pencils each of 5 students has?

1. Use columns labelled Student code and Number of pencils.
2. Enter one whole-number count for each student; check there are 5 rows.

5 records of discrete numerical data.

09 Show the same data in another way

A new display must keep every original response. Tally the data, then draw the graph from those counts and check that the total stays the same.

WORKED EXAMPLE

Change red, blue, red, green, blue, red into column heights.

1. Tally red = 3, blue = 2, green = 1.
2. Check 3 + 2 + 1 = 6 original responses.

Columns: red 3, blue 2, green 1.

10 Explain what a display shows

Use the category names and actual numbers to explain a pattern. Say only what the displayed data supports.

WORKED EXAMPLE

A class graph shows 11 bike votes and 7 scooter votes; explain the difference.

1. Compare 11 with 7.
2. 11 - 7 = 4.

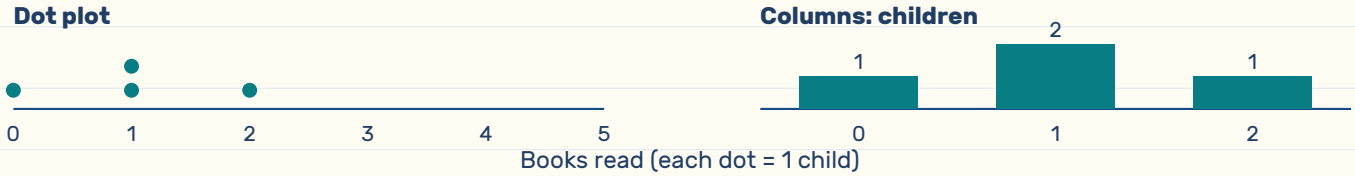
In this class, bikes received 4 more votes than scooters.

Comparing data displays

STATISTICS / VC2M4ST02

01 Choose the best type of graph

Use a column graph to compare category counts or a dot plot to show individual numerical values. Choose the display that makes your question easiest to answer.



WORKED EXAMPLE

For books read, 0, 1, 1, 2, which display shows each child and which shows frequencies?

1. A dot plot has one dot for each child: 4 dots altogether.

2. A column graph has heights 1 at 0 books, 2 at 1 book and 1 at 2 books.

Dot plot: individual values; column graph: frequencies.

02 Notice clusters, gaps and unusual values

A cluster is a group of nearby values; a gap is a space between recorded values. The mode is the most common value, and an unusual value lies away from most of the others.

WORKED EXAMPLE

Describe 0, 1, 1, 1, 2, 2, 3, 6.

1. Most values cluster at 1-2, and 1 is the mode because it occurs 3 times.

2. There is a gap at 4-5; the value 6 is away from the cluster.

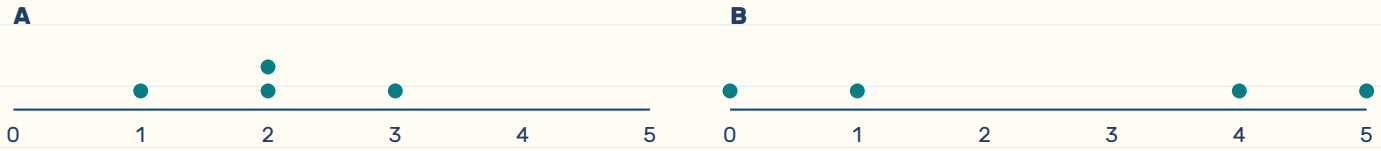
Cluster 1-2; mode 1; gap 4-5; unusual high value 6.

Comparing data displays

STATISTICS / VC2M4ST02

03 Compare spread using range

Range = greatest value - least value. A larger range shows that the values stretch across a wider span.



WORKED EXAMPLE

Compare A = 1, 2, 2, 3 with B = 0, 1, 4, 5.

1. Range A = 3 - 1 = 2.

2. Range B = 5 - 0 = 5, and 5 > 2.

Group B has the larger range.

04 Check that comparisons are fair

Check the titles, units, keys, scale steps and numbers of responses before comparing graphs. Use matching scales for the same kind of data so heights can be compared fairly.

WORKED EXAMPLE

A column is 3 scale steps high on a graph counting by 2; another is 2 steps high counting by 5. Which value is greater?

1. First value: 3 × 2 = 6.

2. Second value: 2 × 5 = 10, and 10 > 6.

The second value is greater, despite using fewer scale steps.

Planning a data investigation

STATISTICS / VC2M4ST03

01 Ask a question about a group

Ask a clear question whose answers may differ across a group. Say who or what you will study and what you want to find out.

WORKED EXAMPLE

Write a question to investigate lunch choices in your class.

1. Choose the group: our class.

2. Ask about one thing that can vary: favourite lunch fruit.

Which fruit does each person in our class prefer for lunch?

02 Choose how to collect data

Choose a survey for people's answers, a count for items, or an observation for events. Include the intended group and use the same method throughout.

WORKED EXAMPLE

How could you find which vehicle type passes the school most often?

1. Observe traffic at one agreed place for 10 minutes.

2. Tally every passing vehicle once using agreed categories.

Use an observation and tally count.

03 Collecting survey responses

Give clear answer choices that fit the question, including other when needed. State whether each person may choose one answer or more, and follow that rule.

WORKED EXAMPLE

Survey the main way classmates travelled to school today.

1. Offer walk, bike, car, bus and other.

2. Ask each classmate once and record one main method.

One travel response per classmate.

04 Record named categories

Categorical data sorts responses into named groups. Use the same category labels for responses with the same meaning.

WORKED EXAMPLE

Record bus, car, bus, walk in a tally table.

1. Bus occurs twice; car and walk occur once each.

2. Check 2 + 1 + 1 = 4 responses.

Bus 2, car 1, walk 1.

05 Record whole-number counts

Discrete numerical data can count complete things, such as books or pets. Give the count a clear heading and use whole numbers, including zero when there are none.

WORKED EXAMPLE

Five children read 2, 0, 3, 2, 1 books; how often was 2 recorded?

1. Find each child whose count is 2.

2. Two children have that count.

The frequency of 2 books is 2.

Planning a data investigation

STATISTICS / VC2M4ST03

06 Choose a useful display

Choose a display that helps answer your question: tables show exact counts, columns compare categories and dot plots show individual number values. Add a title, labels and a clear scale or key.

WORKED EXAMPLE

Which graph would best compare 4 favourite-sport categories?

1. The data are named categories.

2. Separate columns make the four counts easy to compare.

A labelled column graph.

07 Using a digital tool

Set a form or spreadsheet to accept only the kind of answer you need. Test both a suitable entry and an unsuitable one, and correct errors by checking the original response.

WORKED EXAMPLE

A form records complete books read; should it accept 3 and 2.5?

1. Set the rule to whole numbers of zero or more.

2. 3 passes; 2.5 fails because it is not a whole-number count.

Accept 3; check and correct the 2.5 entry.

08 Read what the data shows

Read the recorded counts before describing a pattern. Compare the relevant numbers and use a calculation when you need a difference or total.

WORKED EXAMPLE

A class recorded 9 walkers and 6 bus passengers; compare them.

1. 9 is greater than 6.

2. 9 - 6 = 3.

There were 3 more walkers than bus passengers.

09 Explain the result

A conclusion answers your investigation question using the data. Name the group and support the result with numbers; do not extend it to people you did not study.

WORKED EXAMPLE

Of 20 classmates, 12 chose apples, 5 bananas and 3 pears; conclude.

1. 12 is the largest count.

2. The results describe these 20 classmates.

Apples were most popular among the 20 classmates, with 12 votes.

10 Know what the data cannot tell us

A limitation describes what your evidence cannot show. Think about the people, places and times left out, and keep your conclusion within the group studied.

WORKED EXAMPLE

You counted school-gate traffic for 10 minutes on Monday; can you describe every day?

1. Only one short time on one day was observed.

2. Other days and times might have different traffic.

No; the results describe only that Monday observation.

Likelihood and possible outcomes

PROBABILITY / VC2M4P01

01 More, less and equally likely

List the possible outcomes, then compare how many favour each event when individual outcomes are equally likely. More favourable outcomes mean more likely; equal counts mean equally likely.



R = red; B = blue

WORKED EXAMPLE

A bag has 5 red and 3 blue equal-sized counters; which colour is more likely?

1. Mix the counters so each has the same chance of being drawn.
2. Red has 5 possible counters; blue has 3, and 5 > 3.

Red is more likely.

02 Certain, probable, unlikely and impossible

Impossible means no possible outcome fits, and certain means every outcome fits. Between them, use unlikely, even chance or likely (probable) by comparing the outcomes.

WORKED EXAMPLE

On a fair die numbered 1-6, describe rolling less than 6.

1. The winning outcomes are 1, 2, 3, 4 and 5: five outcomes.
2. Only 6 loses, so winning is more likely than losing.

Likely, but not certain.

03 Identify independent and dependent events

Events are independent if the first result does not change the chance of the next. They are dependent if the first event changes the available choices, as when a counter is not replaced.

WORKED EXAMPLE

A bag has 3 red and 2 blue counters; a red is removed before the next draw. Are the draws dependent?

1. Before: 3 red out of 5 counters.
2. After: 2 red out of 4 counters, so the chance has changed.

Yes, the draws are dependent.

04 Combinations

List each choice from the first group with every choice from the second, without repeating a pair. When every pairing is allowed, multiply the numbers of choices.

WORKED EXAMPLE

There are 2 shirts (red, blue) and 3 hats (black, green, white); how many outfits?

1. Red pairs with all 3 hats; blue also pairs with all 3.
2. $2 \times 3 = 6$.

6 different outfits.

Repeating chance experiments

PROBABILITY / VC2M4P02

01 Conducting repeated chance trials

A trial is one go at a chance activity. Plan how many trials to do, keep the method the same and count every completed go.

WORKED EXAMPLE

You plan 30 coin flips and have completed 18; how many remain?

1. 30 - 18 = 12.

2. Check: 18 + 12 = 30.

12 flips remain.

02 Recording outcomes

Record each result once in a tally or table as it happens. Check that all outcome counts add to the number of trials.

WORKED EXAMPLE

Record H, T, H, H, T, T, H, T.

1. Count heads: 4; count tails: 4.

2. 4 + 4 = 8, matching the 8 flips.

Heads 4, tails 4; total 8.

03 Comparing results from different trials

Compare the same outcome in each set of trials. For equal-sized sets, subtract the counts to find how many more or fewer occurred.

WORKED EXAMPLE

Two sets of 20 flips give 13 heads and 9 heads; find the difference.

1. Both counts are heads from 20-flip sets.

2. 13 - 9 = 4.

The first set has 4 more heads.

04 Observing variation

Variation means the results can change between sets of trials. Compare the earlier count with the later count, then state the direction and size of the change.

WORKED EXAMPLE

In two 20-spin sets, red occurs 8 times, then 11 times; what changed?

1. 11 is greater than 8, so the count increased.

2. 11 - 8 = 3.

Red increased by 3 results.

05 Explaining why results can differ

Random results can differ even when you use the same equipment and rules. A difference alone does not prove that a coin, spinner or game is unfair.

WORKED EXAMPLE

The same fair coin gives 6 heads in 10 flips, then 4 heads in 10 flips; explain.

1. The procedure and coin stayed the same.

2. Each flip is uncertain, so the two counts need not match.

The difference can be ordinary chance variation.

Repeating chance experiments

PROBABILITY / VC2M4P02

06 Comparing small and larger numbers of trials

Combine sets by adding the counts for the same outcome and adding the trial totals. More trials give more evidence, but do not guarantee exactly equal results for equally likely outcomes.

WORKED EXAMPLE

One set gives 7 heads in 10 flips; another gives 8 heads in 20 flips. Combine them.

1. Heads: 7 + 8 = 15.

2. Trials: 10 + 20 = 30.

15 heads in 30 flips altogether.

07 Evaluating simple games

A fair game gives each player the same chance under its rules. List the winning outcomes and compare counts only when individual outcomes are equally likely.

WORKED EXAMPLE

A fair die gives Ava a win on 1-3 and Ben a win on 4-6; is the game fair?

1. Ava has 3 winning outcomes; Ben also has 3.

2. All 6 die outcomes have the same chance.

Yes, both players have an equal chance.

08 Read the trial results

All outcome counts together equal the number of trials. To find how many results were not one outcome, subtract its count from the total.

WORKED EXAMPLE

A spinner is spun 25 times and lands on red 9 times; how many were not red?

1. 25 - 9 = 16.

2. Check: 9 + 16 = 25.

16 results were not red.

09 A few results do not promise the next one

A short record tells you what happened, not what must happen next. For independent trials, earlier results do not make an outcome due or guaranteed.

WORKED EXAMPLE

A fair coin has shown heads 4 times in a row; must the next flip be tails?

1. The earlier flips do not change the coin.

2. Heads and tails still have an equal chance on the next flip.

No; either heads or tails can occur.

10 Describe what happened

Report the outcome, its count and the number of trials clearly. Keep observations separate from predictions and avoid saying always or never based on a short experiment.

WORKED EXAMPLE

Red occurred 7 times in set A and 10 times in set B; each set had 20 spins. Describe it.

1. Compare the counts: 10 - 7 = 3.

2. Keep both labels and the 20-spin totals in the report.

Red occurred 7 times in 20 spins in A and 10 times in 20 spins in B: 3 more in B.

Odd and even numbers

NUMBER / AC9M4N02

01 Look at the ones digit

Even numbers end in 0, 2, 4, 6 or 8 and make complete pairs. Odd numbers end in 1, 3, 5, 7 or 9 and leave one unpaired. Zero is even too.



6: even



7: odd

WORKED EXAMPLE

Is 3,246 odd or even?

1. Look at the ones digit: 6.

2. 6 makes 3 complete pairs, so any whole number ending in 6 is even.

3,246 is even.

02 Add or subtract

Adding or subtracting two numbers of the same type gives an even answer. Different types give an odd answer.

WORKED EXAMPLE

Will 35 + 17 be odd or even?

1. Both numbers are odd, so the answer will be even.

2. 35 + 17 = 35 + 10 + 7 = 52.

52 is even, as predicted.

03 Multiply and explain

If either whole-number factor is even, the product is even because the groups can all be paired. An odd number multiplied by an odd number gives an odd product.

WORKED EXAMPLE

Will 8 × 7 be odd or even?

1. 8 is even, so each group of 8 makes complete pairs.

2. 8 × 7 = 56; the 56 counters make 28 pairs.

The product is even.

04 Use the rules to check

Predict whether an answer must be odd or even before calculating. The wrong type proves an answer is wrong, but the right type does not prove it is correct.

WORKED EXAMPLE

Sam says 46 + 28 = 75; can that be right?

1. Even + even must be even, but 75 is odd.

2. Calculate: 46 + 20 + 8 = 66 + 8 = 74.

No; the correct answer is 74.