Vertex Academy

Year 5 Maths workbook

12 worksheets · answers at the back

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Year 5 · Number: Big Numbers & Place Value

Name: _____ Date: _____

This sheet is all about large whole numbers, reading them, rounding them, and finding factor pairs. Take your time and show your working.

Warm-up

1. Write the number four hundred and six thousand, two hundred and ninety in digits.

2. What is the value of the digit 7 in 573,148?

3. Round 48,637 to the nearest thousand.

4. Which is larger: 205,600 or 250,060?

Practice

5. Order these from smallest to largest: 90,900 99,090 90,090 99,900

6. Round 736,482 to the nearest hundred thousand.

7. List all the factor pairs of 24.

8. A stadium holds 84,000 people. Round this to the nearest ten thousand.

9. Count backwards from 3 in steps of 1 through zero, writing the next four numbers: 3, 2, 1, 0, ...

10. Start at 45,600 and count on in 10,000s. Write the next three numbers.

Challenge

11. I am a 6-digit number. Rounded to the nearest hundred thousand I am 500,000. Rounded to the nearest ten thousand I am 470,000. Give one number I could be.

12. Find two different whole numbers between 1 and 10 whose product is 36, then write both factor pairs of 36 that use only numbers from 1 to 10.

Year 5 · Number: Operation Station

Name: _____ Date: _____

Hi there! This sheet gives your times tables, big adds and subtracts, and sharing (division) a good workout. Take your time and show your steps, you've got this!

Warm-up

1. 1. 7 × 8 = ?

2. 2. 72 ÷ 9 = ?

3. 3. 456 + 238 = ?

4. 4. 803 − 547 = ?

Practice

5. 1. Use column addition: 3,486 + 2,759 = ?

6. 2. Use column subtraction: 5,204 − 1,876 = ?

7. 3. 347 × 6 = ?

8. 4. 34 × 27 = ? (two two-digit numbers)

9. 5. The Avondale Primary bake sale packed 8 boxes of muffins with 125 muffins in each box. How many muffins altogether?

10. 6. A sports shop in Waterview has 470 tennis balls to pack into tubes of 6. How many full tubes are made, and how many balls are left over?

Challenge

11. 1. The Waterview Community Centre has $8,000. They buy 6 tables at $145 each and 24 chairs at $32 each. How much money is left?

12. 2. Divide a four-digit number: 4,517 ÷ 8 = ? Give the answer with a remainder.

Year 5 · Number: Fractions, Decimals & Percentages

Name: _____ Date: _____

Hi! This sheet helps you practise turning between fractions, decimals and percentages, and using them to solve real problems. Take your time and show your working, you've got this!

Warm-up

1. Write 7/10 as a decimal.

2. Write 0.25 as a fraction and as a percentage.

3. Divide 6 by 100.

4. Which is larger: 0.3 or 0.12?

Practice

5. Order these decimals from smallest to largest: 3.55, 3.5, 3.84, 3.08.

6. Multiply 4.27 by 100.

7. Work out 2/3 + 1/9.

8. Aroha's water bottle holds 1.31 litres. She adds another 0.22 litres. How much water is in the bottle now?

9. At Avondale Primary there are 24 pupils in Room 6. 2/3 of them walk to school. How many pupils walk to school?

10. A jacket at The Warehouse costs $80. It is reduced by 25%. How much money is taken off the price?

Challenge

11. Tama has collected 8 shells. This is 2/5 of all the shells he wants for his art project. How many shells does he want altogether?

12. A recipe uses 5/4 cups of flour and 3/4 cups of sugar. Write 5/4 as a mixed number, then find the total number of cups of flour and sugar.

Year 5 · Number: Dollars, Cents and Change

Name: _____ Date: _____

Hi there! This sheet helps you add up money, work out change, and round dollar amounts. Grab a pencil and let's practise being a money whiz!

Warm-up

1. Write this amount using decimal notation: 6 dollars and 45 cents.

2. Write this amount using decimal notation: 12 dollars and 5 cents.

3. Add: $3.20 + $4.50.

4. Round $8.70 to the nearest dollar.

Practice

5. Add these three prices: $2.35 + $1.40 + $3.10.

6. Round each amount to the nearest dollar: (a) $5.30 (b) $11.85.

7. Mereana buys a pie for $4.60 and a juice for $3.25 at the Avondale dairy. What is the total cost?

8. Tane spends $6.40 on a comic. He pays with a $10 note. How much change does he get?

9. At the Sunday market Aroha buys apples for $3.75 and bread for $4.15. She pays with a $10 note. What is her total, and how much change does she receive?

10. A drink bottle costs $12.60. About how much is this to the nearest dollar? Then work out the cost of 2 bottles at the exact price.

Challenge

11. Sione has $20. He buys a school hat for $8.95 and a water bottle for $6.50. How much does he spend altogether, and how much change does he get from his $20?

12. Kaia is buying 3 muffins that cost $2.50 each. Estimate the total by rounding each muffin to the nearest dollar, then work out the exact total. How much smaller is the exact total than the estimate?

Year 5 · Algebra: Balancing and Growing Patterns

Name: _____ Date: _____

Hi there! This sheet helps you compare numbers with <, >, and =, fill in the missing parts of number sentences, and continue growing patterns. Take your time and check your work!

Warm-up

1. Put the correct symbol (<, >, or =) between the numbers: 4,506 ☐ 4,560

2. Fill in the missing number: 25 + ☐ = 40

3. Is this true or false? 7 × 3 = 20 + 1

4. Continue this growing pattern for two more terms: 6, 10, 14, 18, ☐, ☐

Practice

5. Put the correct symbol (<, >, or =) between the two expressions: 2,456 + 3,120 ☐ 3,456 + 2,930

6. Put the correct symbol (<, >, or =) between: 2,456 × 2 ☐ 1,228 × 4

7. Find the missing number: 999,999 − ☐ = 899,999

8. Describe this pattern in words, then write the next two terms: 3, 4.5, 6, 7.5, ☐, ☐

9. At the Avondale Sunday market, Mereana saves money in her jar. She starts with $12 and adds $8 every week. How much is in her jar after 4 weeks of adding? Write the growing pattern.

10. Tane buys 3 packs of feijoas with 6 feijoas in each pack. Hine buys 2 packs with 9 feijoas in each pack. Use <, >, or = to compare who has more feijoas: Tane's total ☐ Hine's total.

Challenge

11. A pattern starts at 100 and is HALVED each step: 100, 50, 25, ☐, ☐. Write the next two terms and describe the rule.

12. Find the missing number that makes this true: 15 + ☐ = 4 × 12. Explain your steps.

Year 5 · Measurement: Rulers, Clocks and Cubes

Name: _____ Date: _____

Hi! This sheet helps you practise measuring length, area, volume, angles and time. Grab a ruler and take your time, always write the unit next to your number!

Warm-up

1. Convert 4 metres into centimetres.

2. Convert 350 cm into metres and centimetres.

3. Find the area of a rectangle that is 7 cm long and 5 cm wide.

4. Is an angle of 130° acute, right, obtuse or reflex?

Practice

5. A regular hexagon has sides of 8 cm each. What is its perimeter?

6. Mele fills a box with centicubes. Each layer has 4 cubes across and 3 cubes back. She stacks 5 layers. What is the volume of the box in cubic centimetres?

7. Tane's rugby practice at Avondale starts at 4:15 p.m. and finishes at 5:50 p.m. How long is the practice?

8. A vegetable garden bed is a rectangle 6 m long and 3 m wide. What is its area, and what is its perimeter?

9. An irregular leaf is drawn on a grid. It fully covers 9 whole squares and also covers 6 half squares. Each square is 1 cm². Estimate the area of the leaf.

10. Aroha makes two rectangles from tiles. Rectangle A is 2 cm by 6 cm. Rectangle B is 3 cm by 4 cm. Show that they have the same area but different perimeters.

Challenge

11. A door is opened so the angle between the door and the wall measures 115°. What is the size of the reflex angle on the other side of the door? Name both angle types.

12. Nikau starts a long bike ride at 10:45 p.m. and finishes at 1:20 a.m. the next day. Using 24-hour time, work out how long he rode for.

Year 5 · Geometry: Prisms, Parallel & Perpendicular

Name: _____ Date: _____

Kia ora! This sheet helps you spot parallel and perpendicular lines and describe prisms by their faces, edges, and vertices. Grab a pencil and let's explore some shapes!

Warm-up

1. What do we call two lines that are always the same distance apart and never meet?

2. When two lines cross at a right angle (90°), what do we call them?

3. A prism has two ends that are identical and parallel. What do we call these matching ends?

4. How many faces does a cube have?

Practice

5. A rectangular prism (like a shoebox) has how many faces, edges, and vertices? List all three.

6. Look at a capital letter L. Do its two straight lines meet at a parallel or perpendicular corner? Explain.

7. A triangular prism has triangle ends. How many faces does it have altogether? Describe them.

8. Mereana is making a fence at her marae. She wants two fence rails that never meet and stay the same distance apart. What kind of lines should the rails be, and why?

9. Tane draws a square for a hopscotch grid at school. In a square, name one pair of parallel sides and one pair of perpendicular sides.

10. Sione has a chocolate block shaped like a rectangular prism. If he slices straight down to make a cross-section, what shape will the cut face be?

Challenge

11. A prism has 2 hexagonal (6-sided) ends. Work out how many faces, edges, and vertices it has. Show your thinking.

12. Amaia notices a pattern in prisms: the number of faces plus vertices seems linked to the edges. Using a triangular prism (5 faces, 6 vertices, 9 edges) and a rectangular prism (6 faces, 8 vertices, 12 edges), find the pattern: what is

faces + vertices – edges each time?

Year 5 · Geometry: Nets

Name: _____ Date: _____

Kia ora! A net is a flat shape that folds up into a 3D shape. Count the faces and picture the folds. Paper and scissors will help with the last questions.

Warm-up

1. How many faces does a cube have?

2. What shape is each face of a cube?

3. How many faces does a square pyramid have?

4. How many faces does a triangular prism have?

Practice

5. A net is made of 6 rectangles. Which 3D shape does it make?

6. A net is made of 1 square and 4 triangles. Which 3D shape does it make?

7. A net is made of 2 triangles and 3 rectangles. Which 3D shape does it make?

8. A net is made of 2 circles and 1 rectangle. Which 3D shape does it make?

9. How many edges and how many corners does a cube have?

10. A box is 2 cm by 3 cm by 4 cm. List the rectangles you need for its net.

Challenge

11. Six squares sit in one straight row. Can they fold into a cube? Explain.

12. Four squares sit in a row, with one more above the second square and one more below it. Can this fold into a cube? Try it with paper.

Year 5 · Geometry: Shapes That Fold, Flip and Slide

Name: _____ Date: _____

Hi there! This sheet helps you match 3D shapes to their nets and describe how shapes move, flips, slides and turns. Take your time and picture each shape in your head!

Warm-up

1. What do we call a flat drawing of a 3D shape that has been unfolded so you can see all its faces?

2. Name the transformation where a shape is flipped over a line to make a mirror image.

3. How many faces does a cube have?

4. When you slide a shape from one place to another without turning or flipping it, what is this called?

Practice

5. Kauri drew a net with 6 equal squares joined in a cross shape. Which 3D shape will this net fold up to make?

6. A net has 1 square in the middle with 4 triangles attached to its sides. What 3D shape does this net make?

7. A shape at position A is moved to position B. It stays exactly the same way up and the same way round, it has only moved 5 cm to the right. Which transformation is this?

8. Aroha holds a letter 'b' up to a mirror on its right-hand side. Describe the transformation and what the letter now looks like.

9. Mere is packing a rectangular box (a cuboid). She unfolds it flat. How many faces does the net have, and what shape are they?

10. Tama turns a triangle a quarter turn (90°) clockwise around one of its corners. Name the transformation and say how far the shape turned.

Challenge

11. A cube has faces numbered 1 to 6. On the net, the '1' is in the centre. Around it are '2', '3', '4' and '5', and '6' is joined to the '2'. When folded, which number will be on the opposite face to the '1'?

12. A shape is first reflected over a vertical line, and then the mirror image is translated 3 cm down. Describe, in order, the two transformations and whether the final shape is the same size as the original.

Year 5 · Statistics: Measuring and Matching Data

Name: _____ Date: _____

Hi! This sheet helps you practise measuring things carefully and rounding to the right place, plus collecting data that has two features for each person. Take your time and show your thinking!

Warm-up

1. Round 47 centimetres to the nearest 10 centimetres.

2. A pencil measures 13.6 cm. Round its length to the nearest centimetre.

3. True or false: bivariate data means each person has two pieces of information recorded about them.

4. A ribbon is 8.2 metres long. Round it to the nearest metre.

Practice

5. Mere measures the heights of four kūmara plants: 24.3 cm, 24.7 cm, 25.2 cm and 24.5 cm. Round each height to the nearest centimetre.

6. Why is it important to say 'measure to the nearest centimetre' before collecting length data for a class survey?

7. At Avondale Primary, Tane records what each student does at lunchtime (plays sport, reads, or eats with friends) and whether they are a boy or a girl. How many variables is Tane collecting for each student, and what type of data is this?

8. Aroha measures the arm span of five friends, rounding to the nearest 5 centimetres. Her raw measurements are 122 cm, 128 cm, 131 cm, 124 cm and 137 cm. Round each to the nearest 5 cm.

9. A class collected bivariate data on pets. They wrote down each student's favourite pet (dog, cat, or fish) and their gender. Here are the counts: Boys, dog 6, cat 2, fish 3. Girls, dog 4, cat 7, fish 1. How many students altogether, and which pet was chosen most often overall?

10. Sione needs to measure the temperature of the school pool. His thermometer shows 19.8°C. The rule says round to the nearest whole degree. What temperature does he record, and why should everyone use the same rounding rule?

Challenge

11. A class of 24 students recorded two things each: how they get to school (walk, bus, or car) and their gender. Boys: walk 5, bus 3, car 4. Girls: walk 6, bus 2, car 4. Make a statement comparing how boys and girls travel, using the data.

12. Kaia measures the length of the classroom in three ways. Rounded to the nearest metre she gets 8 m. Rounded to the nearest 10 centimetres she gets 780 cm. Rounded to the nearest centimetre she gets 784 cm. Explain why the three answers are different but not wrong, and which measurement is the most precise.

Year 5 · Statistics: Grouping Data and Clustered Bar Graphs

Name: _____ Date: _____

Hi! This sheet helps you practise putting number data into groups in a table, and drawing clustered bar graphs where coloured bars sit side-by-side. Take your time and use a ruler for your graphs.

Warm-up

1. A rainfall reading was 2.4 mm. Which group does it belong in: 0–0.99, 1–1.99, 2–2.99, or 3–3.99?

2. Tally these heights into the group 1.0–1.49 m: 1.2 m, 1.45 m, 1.6 m, 1.05 m. How many fit the group?

3. On a bar graph, what is a 'key' used for?

4. A clustered bar graph shows boys and girls at each year level. How many bars would sit side-by-side above 'Year 5'?

Practice

5. Aroha measured the lengths (in metres) of 10 skateboards at the Avondale skate park: 0.7, 0.8, 1.2, 1.5, 1.3, 0.9, 1.8, 1.1, 0.6, 1.4. Make a grouped table using the ranges 0–0.99, 1–1.99, 2–2.99 and write the count for each group.

6. Here are the times (in seconds) 8 students took to run 50 m: 9.2, 10.5, 11.8, 9.9, 12.3, 10.1, 11.2, 12.9. Group them into 9–9.99, 10–10.99, 11–11.99 and 12–12.99. How many are in each group?

7. A class recorded how much rain (in mm) fell each day for a week: 0.4, 1.5, 2.1, 0.8, 1.2, 3.4, 2.7. Using the groups 0–0.99, 1–1.99, 2–2.99, 3–3.99, which group has the most days?

8. Word problem: Vertex Academy asked Year 4 and Year 5 students their favourite lunch. Year 4: pies 6, sushi 4, sandwiches 5. Year 5: pies 3, sushi 8, sandwiches 4. Describe how you would set up a clustered bar graph for this data, including the axes and key.

9. Word problem: Using the lunch data above, how many more Year 5 students than Year 4 students chose sushi, and which year group chose more pies?

10. A group of tomatoes were weighed (in kg): 0.15, 0.22, 0.35, 0.18, 0.29, 0.41, 0.33. Group them into 0–0.09, 0.10–0.19, 0.20–0.29, 0.30–0.39, 0.40–0.49 and give the count for each group.

Challenge

11. Two shops recorded drinks sold on Saturday and Sunday. Shop A: Saturday 40, Sunday 55. Shop B: Saturday 60, Sunday 45. If you drew a clustered bar graph with the two days on the horizontal axis, which day would have the taller total of both bars combined, and by how much?

12. A scientist measured the lengths (in cm) of 12 fish: 5.2, 6.8, 5.9, 7.4, 6.1, 5.5, 8.2, 7.9, 6.3, 5.8, 7.1, 8.6. Group them into 5–5.99, 6–6.99, 7–7.99, 8–8.99. Then work out what fraction of the fish are 7 cm or longer.

Year 5 · Probability: Testing Chance with Trials

Name: _____ Date: _____

Hi there! This sheet is all about chance, how likely things are to happen and what we find out when we actually try an experiment lots of times. Grab a pencil and let's explore!

Warm-up

1. Choose the best word for this event: 'The sun will rise tomorrow morning.' Is it impossible, unlikely, even-chance, likely, or certain?

2. Choose the best word for this event: 'You will roll a 7 on an ordinary six-sided dice.' Is it impossible, unlikely, even-chance, likely, or certain?

3. When you flip a fair coin, what are all the possible outcomes? (This set of outcomes is called the sample space.)

4. A bag has 5 red counters and 5 blue counters. If you take one without looking, is picking a red counter unlikely, even-chance, or likely?

Practice

5. Ana spins a spinner split into 4 equal colours: red, blue, green and yellow. What is the probability the arrow lands on green? Write your answer as a fraction.

6. On the spinner above, what is the probability of landing on either red OR blue?

7. Draw a number line from 0 to 1. Place these three events on it: A – 'It will rain somewhere in New Zealand this week', B – 'You will grow wings and fly to school', C – 'A tossed coin lands on heads'.

8. Word problem: Tama rolls a six-sided dice 30 times and records how often he gets an even number (2, 4 or 6). He gets an even number 14 times. Write his experimental probability of rolling an even number as a fraction, then compare it to what he would expect.

9. Word problem: In Room 12 at Avondale Primary, the teacher puts 8 lolly names in a jar: 3 chocolate, 4 mint and 1 caramel. A name is pulled out at random. Which flavour is most likely to be picked, and what is its probability?

10. Mere flips a coin 20 times and gets 12 heads and 8 tails. What fraction of her flips were tails? Was tails more or less common than expected?

Challenge

11. A spinner has sections coloured red, blue and green. The probability of red is 1/4 and the probability of blue is 1/2. What is the probability of green? Explain how you know.

12. Hemi rolls a dice 60 times. He records 6 appearing 18 times. The theoretical probability of rolling a 6 is 1/6. Roughly how many 6s would he expect in 60 rolls, and does his result suggest the dice might be unfair? Explain.

Answer key (for parents and tutors)

1. Write the number four hundred and six thousand, two hundred and ninety in digits.
   406,290
2. What is the value of the digit 7 in 573,148?
   70,000 (seventy thousand)
3. Round 48,637 to the nearest thousand.
   49,000 (the hundreds digit is 6, so round up)
4. Which is larger: 205,600 or 250,060?
   250,060
5. Order these from smallest to largest: 90,900 99,090 90,090 99,900
   90,090; 90,900; 99,090; 99,900
6. Round 736,482 to the nearest hundred thousand.
   700,000 (the ten-thousands digit is 3, so round down)
7. List all the factor pairs of 24.
   1 and 24, 2 and 12, 3 and 8, 4 and 6
8. A stadium holds 84,000 people. Round this to the nearest ten thousand.
   80,000
9. Count backwards from 3 in steps of 1 through zero, writing the next four numbers: 3, 2, 1, 0, ...
   -1, -2, -3, -4
10. Start at 45,600 and count on in 10,000s. Write the next three numbers.
    55,600; 65,600; 75,600
11. I am a 6-digit number. Rounded to the nearest hundred thousand I am 500,000. Rounded to the nearest ten thousand I am 470,000. Give one number I could be.
    Any number from 465,000 to 469,999 (e.g. 468,200). It rounds to 470,000 to the nearest ten thousand, and 500,000 to the nearest hundred thousand.
12. Find two different whole numbers between 1 and 10 whose product is 36, then write both factor pairs of 36 that use only numbers from 1 to 10.
    4 and 9, and 6 and 6. (Both give 36.)

Answer key (for parents and tutors)

1. 1. 7 × 8 = ?
   7 × 8 = 56. This is a fact to know by heart. (Double 7 is 14, double again is 28, double again is 56.)
2. 2. 72 ÷ 9 = ?
   72 ÷ 9 = 8, because 9 × 8 = 72. Division and multiplication are opposite operations.
3. 3. 456 + 238 = ?
   456 + 238 = 694. Add by place value: 400 + 200 = 600, 50 + 30 = 80, 6 + 8 = 14. Then 600 + 80 + 14 = 694.
4. 4. 803 − 547 = ?
   803 − 547 = 256. Column method: units 3 − 7 needs regrouping, so rename 803 as 700 + 90 + 13. Then 13 − 7 = 6, 90 − 40 = 50, 700 − 500 = 200. Answer 256.
5. 1. Use column addition: 3,486 + 2,759 = ?
   3,486 + 2,759 = 6,245. Units: 6 + 9 = 15 (write 5, carry 1). Tens: 8 + 5 + 1 = 14 (write 4, carry 1). Hundreds: 4 + 7 + 1 = 12 (write 2, carry 1). Thousands: 3 + 2 + 1 = 6. Answer 6,245.
6. 2. Use column subtraction: 5,204 − 1,876 = ?
   5,204 − 1,876 = 3,328. Units: 4 − 6 needs renaming; borrow from tens (but tens is 0, so rename across). 5,204 becomes 4 thousands, 11 hundreds, 9 tens, 14 units. 14 − 6 = 8, 9 − 7 = 2, 11 − 8 = 3, 4 − 1 = 3. Answer 3,328. (Check: 3,328 + 1,876 = 5,204.)
7. 3. 347 × 6 = ?
   347 × 6 = 2,082. Multiply each part: 6 × 7 = 42 (write 2, carry 4). 6 × 40 = 240, plus 4 tens carried = 28 tens (write 8, carry 2). 6 × 300 = 1,800, plus 200 carried = 2,000. Total 2,000 + 80 + 2 = 2,082.
8. 4. 34 × 27 = ? (two two-digit numbers)
   34 × 27 = 918. Split 27 into 20 + 7. 34 × 20 = 680. 34 × 7 = 238. Add: 680 + 238 = 918.
9. 5. The Avondale Primary bake sale packed 8 boxes of muffins with 125 muffins in each box. How many muffins altogether?
   8 × 125 = 1,000 muffins. Strategy: 125 × 8 is the same as 125 × 4 × 2. 125 × 4 = 500, and 500 × 2 = 1,000. There are 1,000 muffins.
10. 6. A sports shop in Waterview has 470 tennis balls to pack into tubes of 6. How many full tubes are made, and how many balls are left over?
    470 ÷ 6 = 78 remainder 2. Working: 6 × 70 = 420, leaving 50. 6 × 8 = 48, leaving 2. So 70 + 8 = 78 tubes with 2 balls left over. Answer: 78 full tubes, 2 balls left.
11. 1. The Waterview Community Centre has $8,000. They buy 6 tables at $145 each and 24 chairs at $32 each. How much money is left?
    Tables: 6 × $145 = $870. Chairs: 24 × $32 = $768 (24 × 30 = 720, 24 × 2 = 48, 720 + 48 = 768). Total spent: $870 + $768 = $1,638. Money left: $8,000 − $1,638 = $6,362.
12. 2. Divide a four-digit number: 4,517 ÷ 8 = ? Give the answer with a remainder.
    4,517 ÷ 8 = 564 remainder 5. Working: 8 into 45 (hundreds) = 5, since 8 × 5 = 40, remainder 5 → bring down 1 to make 51. 8 into 51 = 6, since 8 × 6 = 48, remainder 3 → bring down 7 to make 37. 8 into 37 = 4, since 8 × 4 = 32, remainder 5. So the answer is 564 r5. Check: 564 × 8 = 4,512, plus 5 = 4,517. Correct.

Answer key (for parents and tutors)

1. Write 7/10 as a decimal.
   7/10 means 7 tenths. One tenth is 0.1, so 7 tenths is 0.7.
2. Write 0.25 as a fraction and as a percentage.
   0.25 = 25/100, which simplifies to 1/4. As a percentage it is 25%.
3. Divide 6 by 100.
   6 ÷ 100 = 0.06. The 6 moves two places to the right into the hundredths place.
4. Which is larger: 0.3 or 0.12?
   0.3 is the same as 0.30. Compare 0.30 and 0.12: 30 hundredths is more than 12 hundredths, so 0.3 is larger. 0.3 > 0.12.
5. Order these decimals from smallest to largest: 3.55, 3.5, 3.84, 3.08.
   Line up the decimal places. 3.08 (8 hundredths), then 3.5 (=3.50), then 3.55, then 3.84. Answer: 3.08, 3.5, 3.55, 3.84.
6. Multiply 4.27 by 100.
   When you multiply by 100 each digit moves two places to the left. 4.27 × 100 = 427.
7. Work out 2/3 + 1/9.
   The denominators are not the same, but 9 is a multiple of 3. Change 2/3 into ninths: 2/3 = 6/9. Then 6/9 + 1/9 = 7/9.
8. Aroha's water bottle holds 1.31 litres. She adds another 0.22 litres. How much water is in the bottle now?
   Add the decimals: 1.31 + 0.22. Hundredths: 1+2=3. Tenths: 3+2=5. Ones: 1+0=1. Total = 1.53 litres.
9. At Avondale Primary there are 24 pupils in Room 6. 2/3 of them walk to school. How many pupils walk to school?
   Find 1/3 of 24 first: 24 ÷ 3 = 8. Then 2/3 is 2 × 8 = 16. So 16 pupils walk to school.
10. A jacket at The Warehouse costs $80. It is reduced by 25%. How much money is taken off the price?
    25% is the same as 1/4. Find 1/4 of $80: 80 ÷ 4 = 20. So $20 is taken off the price.
11. Tama has collected 8 shells. This is 2/5 of all the shells he wants for his art project. How many shells does he want altogether?
    If 2/5 is 8 shells, then 1/5 is 8 ÷ 2 = 4 shells. The whole set is 5/5, so 5 × 4 = 20 shells. Tama wants 20 shells altogether.
12. A recipe uses 5/4 cups of flour and 3/4 cups of sugar. Write 5/4 as a mixed number, then find the total number of cups of flour and sugar.
    5/4 = 4/4 + 1/4 = 1 and 1/4 cups. To add flour and sugar, use the same denominator: 5/4 + 3/4 = 8/4 = 2 cups. So there are 2 cups in total.

Answer key (for parents and tutors)

1. Write this amount using decimal notation: 6 dollars and 45 cents.
   $6.45. The dollars go before the decimal point and the cents (45) go after it.

2. Write this amount using decimal notation: 12 dollars and 5 cents.
   $12.05. Because 5 cents is less than 10, we need a zero to hold the tenths place: $12.05 (not $12.5).

3. Add: $3.20 + $4.50.
   $7.70. Add the dollars: 3 + 4 = 7. Add the cents: 20 + 50 = 70. So $7.70.

4. Round $8.70 to the nearest dollar.
   $9. The cents (70) are 50 or more, so we round up from $8 to $9.

5. Add these three prices: $2.35 + $1.40 + $3.10.
   $6.85. Cents: 35 + 40 + 10 = 85 cents. Dollars: 2 + 1 + 3 = 6. Total = $6.85.

6. Round each amount to the nearest dollar: (a) $5.30 (b) $11.85.
   (a) $5, the cents (30) are less than 50, so round down to $5. (b) $12, the cents (85) are 50 or more, so round up to $12.

7. Mereana buys a pie for $4.60 and a juice for $3.25 at the Avondale dairy. What is the total cost?
   $7.85. Add the cents: 60 + 25 = 85 cents. Add the dollars: 4 + 3 = 7. Total = $7.85.

8. Tane spends $6.40 on a comic. He pays with a $10 note. How much change does he get?
   $3.60. Change = $10.00 − $6.40. From $6.40 to $7.00 is 60 cents, then $7 to $10 is $3. So change = $3.60.

9. At the Sunday market Aroha buys apples for $3.75 and bread for $4.15. She pays with a $10 note. What is her total, and how much change does she receive?
   Total = $7.90 (cents: 75 + 15 = 90; dollars: 3 + 4 = 7). Change = $10.00 − $7.90 = $2.10 (from $7.90 to $8.00 is 10 cents, then $8 to $10 is $2, so $2.10).

10. A drink bottle costs $12.60. About how much is this to the nearest dollar? Then work out the cost of 2 bottles at the exact price.
    To the nearest dollar: $13 (the cents, 60, are 50 or more so round up). Exact cost of 2 bottles: $12.60 × 2 = $25.20 (double the cents: 60 + 60 = 120 cents = $1.20; double the dollars: $24; total $25.20).

11. Sione has $20. He buys a school hat for $8.95 and a water bottle for $6.50. How much does he spend altogether, and how much change does he get from his $20?
    Total = $15.45. Cents: 95 + 50 = 145 cents = $1 and 45 cents. Dollars: 8 + 6 = 14, plus the extra $1 = $15, and 45 cents left over, so $15.45. Change = $20.00 − $15.45 = $4.55 (from $15.45 to $16.00 is 55 cents, then $16 to $20 is $4, so $4.55).

12. Kaia is buying 3 muffins that cost $2.50 each. Estimate the total by rounding each muffin to the nearest dollar, then work out the exact total. How much smaller is the exact total than the estimate?
    Estimate: $2.50 rounds up to $3, so 3 × $3 = $9. Exact total: $2.50 × 3 = $7.50 (three lots of $2 is $6, three lots of 50c is $1.50, total $7.50). The exact total is $9.00 − $7.50 = $1.50 smaller than the estimate.

Answer key (for parents and tutors)

1. Put the correct symbol (<, >, or =) between the numbers: 4,506 ☐ 4,560
   Compare place values. Both have 4 thousands and 5 hundreds. Next digit: 0 tens vs 6 tens, so 4,506 is smaller. Answer: 4,506 < 4,560

2. Fill in the missing number: 25 + ☐ = 40
   We need what adds to 25 to make 40. 40 − 25 = 15. Answer: 25 + 15 = 40

3. Is this true or false? 7 × 3 = 20 + 1
   Work out both sides. Left: 7 × 3 = 21. Right: 20 + 1 = 21. Both equal 21, so the sentence is TRUE.

4. Continue this growing pattern for two more terms: 6, 10, 14, 18, ☐, ☐
   Each term increases by a constant of 4. 18 + 4 = 22, then 22 + 4 = 26. Answer: 22, 26

5. Put the correct symbol (<, >, or =) between the two expressions: 2,456 + 3,120 ☐ 3,456 + 2,930
   Left side: 2,456 + 3,120 = 5,576. Right side: 3,456 + 2,930 = 6,386. Since 5,576 is smaller, the answer is: 2,456 + 3,120 < 3,456 + 2,930

6. Put the correct symbol (<, >, or =) between: 2,456 × 2 ☐ 1,228 × 4
   Left side: 2,456 × 2 = 4,912. Right side: 1,228 × 4 = 4,912. Both are equal. Answer: 2,456 × 2 = 1,228 × 4

7. Find the missing number: 999,999 − ☐ = 899,999
   The difference between the two numbers is what was subtracted. 999,999 − 899,999 = 100,000. Answer: 999,999 − 100,000 = 899,999

8. Describe this pattern in words, then write the next two terms: 3, 4.5, 6, 7.5, ☐, ☐
   Each term increases by a constant of 1.5 (3 → 4.5 is +1.5, and so on). Next terms: 7.5 + 1.5 = 9, then 9 + 1.5 = 10.5. Answer: the pattern adds 1.5 each time; next terms are 9 and 10.5

9. At the Avondale Sunday market, Mereana saves money in her jar. She starts with $12 and adds $8 every week. How much is in her jar after 4 weeks of adding? Write the growing pattern.
   Start: $12. Add $8 each week: Week 1: $12 + $8 = $20. Week 2: $20 + $8 = $28. Week 3: $28 + $8 = $36. Week 4: $36 + $8 = $44. The pattern is 12, 20, 28, 36, 44. After 4 weeks she has $44.

10. Tane buys 3 packs of feijoas with 6 feijoas in each pack. Hine buys 2 packs with 9 feijoas in each pack. Use <, >, or = to compare who has more feijoas: Tane's total ☐ Hine's total.
    Tane: 3 × 6 = 18 feijoas. Hine: 2 × 9 = 18 feijoas. They have the same amount. Answer: Tane's total = Hine's total (both 18)

11. A pattern starts at 100 and is HALVED each step: 100, 50, 25, ☐, ☐. Write the next two terms and describe the rule.
    This is a geometric pattern where each term is divided by 2. 25 ÷ 2 = 12.5, then 12.5 ÷ 2 = 6.25. Answer: next terms are 12.5 and 6.25; the rule is 'divide by 2 each time' (or halve).

12. Find the missing number that makes this true: 15 + ☐ = 4 × 12. Explain your steps.
    First work out the right side: 4 × 12 = 48. Now the sentence is 15 + ☐ = 48. To find the missing number, subtract: 48 − 15 = 33. Answer: 15 + 33 = 48, so the missing number is 33.

Answer key (for parents and tutors)

1. Convert 4 metres into centimetres.
   There are 100 cm in 1 m, so 4 × 100 = 400 cm.

2. Convert 350 cm into metres and centimetres.
   100 cm = 1 m. 350 cm = 300 cm + 50 cm = 3 m and 50 cm (also written 3.5 m).

3. Find the area of a rectangle that is 7 cm long and 5 cm wide.
   Area = length × width = 7 × 5 = 35 cm².

4. Is an angle of 130° acute, right, obtuse or reflex?
   It is more than 90° but less than 180°, so it is an obtuse angle.

5. A regular hexagon has sides of 8 cm each. What is its perimeter?
   A regular hexagon has 6 equal sides. Perimeter = 6 × 8 = 48 cm.

6. Mele fills a box with centicubes. Each layer has 4 cubes across and 3 cubes back. She stacks 5 layers. What is the volume of the box in cubic centimetres?
   Cubes in one layer = 4 × 3 = 12. Total = 12 × 5 = 60 cubes, so the volume is 60 cm³.

7. Tane's rugby practice at Avondale starts at 4:15 p.m. and finishes at 5:50 p.m. How long is the practice?
   From 4:15 to 5:15 is 1 hour. From 5:15 to 5:50 is 35 minutes. Total = 1 hour and 35 minutes.

8. A vegetable garden bed is a rectangle 6 m long and 3 m wide. What is its area, and what is its perimeter?
   Area = 6 × 3 = 18 m². Perimeter = 6 + 3 + 6 + 3 = 18 m.

9. An irregular leaf is drawn on a grid. It fully covers 9 whole squares and also covers 6 half squares. Each square is 1 cm². Estimate the area of the leaf.
   6 half squares = 6 ÷ 2 = 3 whole squares. Total = 9 + 3 = 12 squares, so about 12 cm².

10. Aroha makes two rectangles from tiles. Rectangle A is 2 cm by 6 cm. Rectangle B is 3 cm by 4 cm. Show that they have the same area but different perimeters.
    Area A = 2 × 6 = 12 cm². Area B = 3 × 4 = 12 cm². Same area! Perimeter A = 2 + 6 + 2 + 6 = 16 cm. Perimeter B = 3 + 4 + 3 + 4 = 14 cm. Different perimeters, so equal areas can have different perimeters.

11. A door is opened so the angle between the door and the wall measures 115°. What is the size of the reflex angle on the other side of the door? Name both angle types.
    Angles around a point add to 360°. Reflex angle = 360 − 115 = 245°. The 115° angle is obtuse (between 90° and 180°); the 245° angle is reflex (between 180° and 360°).

12. Nikau starts a long bike ride at 10:45 p.m. and finishes at 1:20 a.m. the next day. Using 24-hour time, work out how long he rode for.
    10:45 p.m. = 22:45 and 1:20 a.m. = 01:20. From 22:45 to midnight (24:00) is 1 hour 15 minutes. From midnight to 01:20 is 1 hour 20 minutes. Total = 1 h 15 min + 1 h 20 min = 2 hours and 35 minutes.

Answer key (for parents and tutors)

1. What do we call two lines that are always the same distance apart and never meet?
   Parallel lines. They stay the same distance apart no matter how far they go, like the two long rails of a train track.
2. When two lines cross at a right angle (90°), what do we call them?
   Perpendicular lines. They meet and form a square corner of exactly 90°.
3. A prism has two ends that are identical and parallel. What do we call these matching ends?
   The two identical, parallel ends are called the bases (or the cross-section faces). For example, a triangular prism has two identical triangle ends.
4. How many faces does a cube have?
   A cube has 6 faces. Each face is a square, and they are all the same size.
5. A rectangular prism (like a shoebox) has how many faces, edges, and vertices? List all three.
   Faces = 6, Edges = 12, Vertices = 8. A rectangular prism has 6 flat faces, 12 straight edges where faces meet, and 8 corners (vertices).
6. Look at a capital letter L. Do its two straight lines meet at a parallel or perpendicular corner? Explain.
   They meet at a perpendicular corner. The vertical line and the horizontal line cross at a right angle (90°), so they are perpendicular.
7. A triangular prism has triangle ends. How many faces does it have altogether? Describe them.
   It has 5 faces: 2 triangular ends (the bases) and 3 rectangular faces joining them. So there are 2 triangles and 3 rectangles, giving 5 faces in total.
8. Mereana is making a fence at her marae. She wants two fence rails that never meet and stay the same distance apart. What kind of lines should the rails be, and why?
   They should be parallel lines. Parallel lines always stay the same distance apart and never meet, so the two rails will never touch and the fence will look even the whole way along.
9. Tane draws a square for a hopscotch grid at school. In a square, name one pair of parallel sides and one pair of perpendicular sides.
   A parallel pair: the top side and the bottom side (they never meet and stay the same distance apart). A perpendicular pair: the top side and the left side (they meet at a right angle of 90°). In fact, every corner of a square has two perpendicular sides, and each side is parallel to the side opposite it.
10. Sione has a chocolate block shaped like a rectangular prism. If he slices straight down to make a cross-section, what shape will the cut face be?
    The cross-section will be a rectangle. Because a rectangular prism has the same rectangle shape all the way through, cutting straight across gives a rectangle that matches the ends.
11. A prism has 2 hexagonal (6-sided) ends. Work out how many faces, edges, and vertices it has. Show your thinking.
    Faces: 2 hexagon ends + 6 rectangle sides = 8 faces. Vertices: each hexagon has 6 corners, and there are 2 hexagons, so 6 × 2 = 12 vertices. Edges: each hexagon has 6 edges (6 × 2 = 12), plus 6 edges joining the two ends, so 12 + 6 = 18 edges. Answer: 8 faces, 18 edges, 12 vertices.
12. Amaia notices a pattern in prisms: the number of faces plus vertices seems linked to the edges. Using a triangular prism (5 faces, 6 vertices, 9 edges) and a rectangular prism (6 faces, 8 vertices, 12 edges), find the pattern: what is faces + vertices − edges each time?
    For the triangular prism: 5 + 6 − 9 = 2. For the rectangular prism: 6 + 8 − 12 = 2. Each time the answer is 2! This is a famous rule for solid shapes: Faces + Vertices − Edges = 2. You can test it on any prism and it always gives 2.

Answer key (for parents and tutors)

1. How many faces does a cube have?
   6 faces.
2. What shape is each face of a cube?
   A square.
3. How many faces does a square pyramid have?
   5 faces: 1 square and 4 triangles.
4. How many faces does a triangular prism have?
   5 faces: 2 triangles and 3 rectangles.
5. A net is made of 6 rectangles. Which 3D shape does it make?
   A cuboid.
6. A net is made of 1 square and 4 triangles. Which 3D shape does it make?
   A square pyramid.
7. A net is made of 2 triangles and 3 rectangles. Which 3D shape does it make?
   A triangular prism.
8. A net is made of 2 circles and 1 rectangle. Which 3D shape does it make?
   A cylinder.
9. How many edges and how many corners does a cube have?
   12 edges and 8 corners.
10. A box is 2 cm by 3 cm by 4 cm. List the rectangles you need for its net.
    2 rectangles of 2 cm by 3 cm, 2 of 2 cm by 4 cm, and 2 of 3 cm by 4 cm. That is 6 rectangles.
11. Six squares sit in one straight row. Can they fold into a cube? Explain.
    No. Wrapping the row round, the first and fifth squares land on the same face, so the top and bottom stay open.
12. Four squares sit in a row, with one more above the second square and one more below it. Can this fold into a cube? Try it with paper.
    Yes. The row wraps round four sides, and the other two squares become the top and bottom.

Answer key (for parents and tutors)

1. What do we call a flat drawing of a 3D shape that has been unfolded so you can see all its faces?
   A net. It shows every surface of the 3D shape spread out flat.
2. Name the transformation where a shape is flipped over a line to make a mirror image.
   A reflection. The shape looks like it does in a mirror on the other side of the line.
3. How many faces does a cube have?
   A cube has 6 faces, all of them squares that are the same size.
4. When you slide a shape from one place to another without turning or flipping it, what is this called?
   A translation. The shape stays the same way up and the same way round, it just moves position.
5. Kauri drew a net with 6 equal squares joined in a cross shape. Which 3D shape will this net fold up to make?
   A cube. Six equal squares are exactly what a cube needs, one for each of its 6 faces.
6. A net has 1 square in the middle with 4 triangles attached to its sides. What 3D shape does this net make?
   A square-based pyramid. The square is the base and the 4 triangles fold up to meet at a point on top.
7. A shape at position A is moved to position B. It stays exactly the same way up and the same way round, it has only moved 5 cm to the right. Which transformation is this?
   A translation (a slide). Nothing has been turned or flipped, so it is a translation of 5 cm to the right.
8. Aroha holds a letter 'b' up to a mirror on its right-hand side. Describe the transformation and what the letter now looks like.
   It is a reflection. The 'b' is flipped over the vertical mirror line, so it looks like a 'd' (a mirror image).
9. Mere is packing a rectangular box (a cuboid). She unfolds it flat. How many faces does the net have, and what shape are they?
   The net has 6 faces, and they are all rectangles. Opposite faces of a cuboid match: they come in 3 matching pairs.
10. Tama turns a triangle a quarter turn (90°) clockwise around one of its corners. Name the transformation and say how far the shape turned.
    It is a rotation. The triangle turned 90° (a quarter turn) clockwise around the fixed corner point.
11. A cube has faces numbered 1 to 6. On the net, the '1' is in the centre. Around it are '2', '3', '4' and '5', and '6' is joined to the '2'. When folded, which number will be on the opposite face to the '1'?
    The '6' is opposite the '1'. The centre face (1) meets four faces folding up around it (2, 3, 4, 5), so those four become the sides. The '6', joined beyond the '2', folds right over the top to sit opposite the centre '1'.
12. A shape is first reflected over a vertical line, and then the mirror image is translated 3 cm down. Describe, in order, the two transformations and whether the final shape is the same size as the original.
    First transformation: a reflection over the vertical line, this flips the shape into a mirror image. Second transformation: a translation of 3 cm down, this slides the mirror image straight down without turning it. Both reflections and translations keep the shape the same size and shape, so the final shape is exactly the same size as the original (it is congruent), just flipped and moved.

Answer key (for parents and tutors)

1. Round 47 centimetres to the nearest 10 centimetres.
   Look at the ones digit, which is 7. Because 7 is 5 or more, we round up. 47 cm rounds up to 50 cm.
2. A pencil measures 13.6 cm. Round its length to the nearest centimetre.
   The digit after the decimal point is 6. Because 6 is 5 or more, round up. 13.6 cm rounds to 14 cm.
3. True or false: bivariate data means each person has two pieces of information recorded about them.
   True. 'Bi' means two. Bivariate data records two variables for each subject, for example a student's favourite sport and their year level.
4. A ribbon is 8.2 metres long. Round it to the nearest metre.
   The digit after the decimal point is 2. Because 2 is less than 5, round down. 8.2 m rounds to 8 m.
5. Mere measures the heights of four kūmara plants: 24.3 cm, 24.7 cm, 25.2 cm and 24.5 cm. Round each height to the nearest centimetre.
   24.3 → the .3 is less than 5, so round down to 24 cm. 24.7 → the .7 is 5 or more, round up to 25 cm. 25.2 → the .2 is less than 5, round down to 25 cm. 24.5 → the .5 is 5 or more, round up to 25 cm. Answers: 24 cm, 25 cm, 25 cm, 25 cm.
6. Why is it important to say 'measure to the nearest centimetre' before collecting length data for a class survey?
   It tells everyone the same rounding rule so all measurements are recorded the same way. Without a rule, one person might write 24 cm and another 24.3 cm for the same length, making the data hard to compare fairly.
7. At Avondale Primary, Tane records what each student does at lunchtime (plays sport, reads, or eats with friends) and whether they are a boy or a girl. How many variables is Tane collecting for each student, and what type of data is this?
   Tane records two things for each student: the lunchtime activity AND whether they are a boy or girl. Two variables per subject means this is bivariate data. Both variables are categorical (they sort people into groups rather than being measurements).
8. Aroha measures the arm span of five friends, rounding to the nearest 5 centimetres. Her raw measurements are 122 cm, 128 cm, 131 cm, 124 cm and 137 cm. Round each to the nearest 5 cm.
   Find the nearest multiple of 5. 122 → nearest multiples are 120 and 125; 122 is closer to 120, so 120 cm. 128 → between 125 and 130; closer to 130, so 130 cm. 131 → between 130 and 135; closer to 130, so 130 cm. 124 → between 120 and 125; closer to 125, so 125 cm. 137 → between 135 and 140; closer to 135, so 135 cm. Answers: 120, 130, 130, 125, 135 cm.
9. A class collected bivariate data on pets. They wrote down each student's favourite pet (dog, cat, or fish) and their gender. Here are the counts: Boys, dog 6, cat 2, fish 3. Girls, dog 4, cat 7, fish 1. How many students altogether, and which pet was chosen most often overall?
   Add all the counts: boys 6+2+3 = 11, girls 4+7+1 = 12. Total = 11 + 12 = 23 students. Now add each pet across both genders: dog 6+4 = 10, cat 2+7 = 9, fish 3+1 = 4. The most chosen pet overall is the dog, with 10 students.
10. Sione needs to measure the temperature of the school pool. His thermometer shows 19.8°C. The rule says round to the nearest whole degree. What temperature does he record, and why should everyone use the same rounding rule?
    The digit after the decimal is 8, which is 5 or more, so round up: 19.8°C rounds to 20°C. Everyone should use the same rounding rule so the recorded temperatures can be fairly compared and combined, instead of some people writing decimals and others whole numbers.
11. A class of 24 students recorded two things each: how they get to school (walk, bus, or car) and their gender. Boys: walk 5, bus 3, car 4. Girls: walk 6, bus 2, car 4. Make a statement comparing how boys and girls travel, using the data.
    First check totals: boys 5+3+4 = 12, girls 6+2+4 = 12, total 24 ✓. Compare each travel type: walking, girls 6 vs boys 5, so more girls walk. Bus, boys 3 vs girls 2, so more boys take the bus. Car, 4 boys and 4 girls, the same. A good statement: 'More girls walked to school than boys, more boys took the bus than girls, and an equal number of boys and girls came by car.' This uses both variables (travel method and gender) to make the comparison.
12. Kaia measures the length of the classroom in three ways. Rounded to the nearest metre she gets 8 m. Rounded to the nearest 10 centimetres she gets 780 cm. Rounded to the nearest centimetre she gets 784 cm. Explain why the three

answers are different but not wrong, and which measurement is the most precise.

All three describe the same real length of about 784 cm, but each uses a different rounding rule. Rounding to the nearest metre gives 8 m because 784 cm is closest to 800 cm (8 m). Rounding to the nearest 10 cm gives 780 cm because 784 is closer to 780 than 790. Rounding to the nearest centimetre keeps the most detail, 784 cm. None is wrong, they just answer to different levels of accuracy. The nearest centimetre (784 cm) is the most precise because it rounds to the smallest place value, keeping the most information.

Answer key (for parents and tutors)

1. A rainfall reading was 2.4 mm. Which group does it belong in: 0–0.99, 1–1.99, 2–2.99, or 3–3.99?
   2.4 is between 2 and 2.99, so it belongs in the group 2–2.99 mm.
2. Tally these heights into the group 1.0–1.49 m: 1.2 m, 1.45 m, 1.6 m, 1.05 m. How many fit the group?
   Check each: 1.2 (yes), 1.45 (yes), 1.6 (no, it is 1.5 or more), 1.05 (yes). So 3 heights fit the group 1.0–1.49 m.
3. On a bar graph, what is a 'key' used for?
   A key explains what each colour of bar means, so the reader knows which variable each coloured bar stands for.
4. A clustered bar graph shows boys and girls at each year level. How many bars would sit side-by-side above 'Year 5'?
   Two bars sit side-by-side above Year 5, one coloured bar for boys and one coloured bar for girls.
5. Aroha measured the lengths (in metres) of 10 skateboards at the Avondale skate park: 0.7, 0.8, 1.2, 1.5, 1.3, 0.9, 1.8, 1.1, 0.6, 1.4. Make a grouped table using the ranges 0–0.99, 1–1.99, 2–2.99 and write the count for each group.
   Sort into groups. 0–0.99: 0.7, 0.8, 0.9, 0.6 = 4 boards. 1–1.99: 1.2, 1.5, 1.3, 1.8, 1.1, 1.4 = 6 boards. 2–2.99: none = 0. Table: 0–0.99 → 4, 1–1.99 → 6, 2–2.99 → 0. Total = 4 + 6 + 0 = 10, which matches the 10 measurements.
6. Here are the times (in seconds) 8 students took to run 50 m: 9.2, 10.5, 11.8, 9.9, 12.3, 10.1, 11.2, 12.9. Group them into 9–9.99, 10–10.99, 11–11.99 and 12–12.99. How many are in each group?
   9–9.99: 9.2, 9.9 = 2 students. 10–10.99: 10.5, 10.1 = 2 students. 11–11.99: 11.8, 11.2 = 2 students. 12–12.99: 12.3, 12.9 = 2 students. Each group has 2 students, and 2 + 2 + 2 + 2 = 8, matching the 8 times.
7. A class recorded how much rain (in mm) fell each day for a week: 0.4, 1.5, 2.1, 0.8, 1.2, 3.4, 2.7. Using the groups 0–0.99, 1–1.99, 2–2.99, 3–3.99, which group has the most days?
   0–0.99: 0.4, 0.8 = 2 days. 1–1.99: 1.5, 1.2 = 2 days. 2–2.99: 2.1, 2.7 = 2 days. 3–3.99: 3.4 = 1 day. The three groups 0–0.99, 1–1.99 and 2–2.99 each have 2 days, so they are tied for the most days (2 each).
8. Word problem: Vertex Academy asked Year 4 and Year 5 students their favourite lunch. Year 4: pies 6, sushi 4, sandwiches 5. Year 5: pies 3, sushi 8, sandwiches 4. Describe how you would set up a clustered bar graph for this data, including the axes and key.
   Put the three lunch types (pies, sushi, sandwiches) along the horizontal axis. Put the number of students (0 to 8, going up in ones or twos) on the vertical axis. Above each lunch type draw two bars side-by-side: one colour for Year 4 and a different colour for Year 5. Add a key showing, for example, blue = Year 4 and red = Year 5. Bar heights: pies (Year 4 = 6, Year 5 = 3), sushi (Year 4 = 4, Year 5 = 8), sandwiches (Year 4 = 5, Year 5 = 4).
9. Word problem: Using the lunch data above, how many more Year 5 students than Year 4 students chose sushi, and which year group chose more pies?
   Sushi: Year 5 = 8, Year 4 = 4, so 8 − 4 = 4 more Year 5 students chose sushi. Pies: Year 4 = 6 and Year 5 = 3, so Year 4 chose more pies (6 is greater than 3).
10. A group of tomatoes were weighed (in kg): 0.15, 0.22, 0.35, 0.18, 0.29, 0.41, 0.33. Group them into 0–0.09, 0.10–0.19, 0.20–0.29, 0.30–0.39, 0.40–0.49 and give the count for each group.
    0–0.09: none = 0. 0.10–0.19: 0.15, 0.18 = 2. 0.20–0.29: 0.22, 0.29 = 2. 0.30–0.39: 0.35, 0.33 = 2. 0.40–0.49: 0.41 = 1. Total = 0 + 2 + 2 + 2 + 1 = 7, matching the 7 tomatoes.
11. Two shops recorded drinks sold on Saturday and Sunday. Shop A: Saturday 40, Sunday 55. Shop B: Saturday 60, Sunday 45. If you drew a clustered bar graph with the two days on the horizontal axis, which day would have the taller total of both bars combined, and by how much?
    Saturday total = Shop A 40 + Shop B 60 = 100 drinks. Sunday total = Shop A 55 + Shop B 45 = 100 drinks. Both days combine to 100 drinks, so neither is taller, the totals are equal (a difference of 0).
12. A scientist measured the lengths (in cm) of 12 fish: 5.2, 6.8, 5.9, 7.4, 6.1, 5.5, 8.2, 7.9, 6.3, 5.8, 7.1, 8.6. Group them into 5–5.99, 6–6.99, 7–7.99, 8–8.99. Then work out what fraction of the fish are 7 cm or longer.
    5–5.99: 5.2, 5.9, 5.5, 5.8 = 4 fish. 6–6.99: 6.8, 6.1, 6.3 = 3 fish. 7–7.99: 7.4, 7.9, 7.1 = 3 fish. 8–8.99: 8.2, 8.6 = 2 fish. Total = 4 + 3 + 3 + 2 = 12. Fish 7 cm or longer are the 7–7.99 group (3) plus the 8–8.99 group (2) = 5 fish. Fraction = 5 out of 12, written as 5/12.

Answer key (for parents and tutors)

1. Choose the best word for this event: 'The sun will rise tomorrow morning.' Is it impossible, unlikely, even-chance, likely, or certain?
   Certain. The sun rises every single day, so this event will definitely happen. It sits at 1 on the probability number line.

2. Choose the best word for this event: 'You will roll a 7 on an ordinary six-sided dice.' Is it impossible, unlikely, even-chance, likely, or certain?
   Impossible. A normal dice only has the numbers 1, 2, 3, 4, 5 and 6, so a 7 can never appear. It sits at 0 on the probability number line.

3. When you flip a fair coin, what are all the possible outcomes? (This set of outcomes is called the sample space.)
   The sample space is {heads, tails}. There are 2 possible outcomes, and each is equally likely with a probability of ½ (0.5).

4. A bag has 5 red counters and 5 blue counters. If you take one without looking, is picking a red counter unlikely, even-chance, or likely?
   Even-chance. There are 5 red and 5 blue out of 10 counters, so red has 5 ways out of 10, which is ½ (0.5). Red and blue are equally likely.

5. Ana spins a spinner split into 4 equal colours: red, blue, green and yellow. What is the probability the arrow lands on green? Write your answer as a fraction.
   There are 4 equal sections and only 1 is green. Probability = number of green sections ÷ total sections = 1 ÷ 4 = ¼. So the probability of landing on green is ¼.

6. On the spinner above, what is the probability of landing on either red OR blue?
   Red is 1 section and blue is 1 section, so together that is 2 favourable sections out of 4. Probability = 2 ÷ 4 = ½. So the chance of red or blue is ½ (0.5).

7. Draw a number line from 0 to 1. Place these three events on it: A – 'It will rain somewhere in New Zealand this week', B – 'You will grow wings and fly to school', C – 'A tossed coin lands on heads'.
   Event B goes at 0 (impossible – people cannot grow wings). Event C goes at ½ in the middle (even-chance – a coin has an equal chance of heads or tails). Event A goes close to 1, on the 'very likely' part, because it almost always rains somewhere in NZ during a week. Order along the line: B (0), C (½), A (near 1).

8. Word problem: Tama rolls a six-sided dice 30 times and records how often he gets an even number (2, 4 or 6). He gets an even number 14 times. Write his experimental probability of rolling an even number as a fraction, then compare it to what he would expect.
   Experimental probability = number of even results ÷ total trials = 14 ÷ 30 = 14/30, which simplifies to 7/15. The expected (theoretical) probability is 3 even numbers out of 6 = 3/6 = ½. 7/15 is about 0.47, which is very close to ½, so the experiment gave a result near what we expected.

9. Word problem: In Room 12 at Avondale Primary, the teacher puts 8 lolly names in a jar: 3 chocolate, 4 mint and 1 caramel. A name is pulled out at random. Which flavour is most likely to be picked, and what is its probability?
   Mint is most likely because it has the most names (4). Probability of mint = 4 ÷ 8 = ½ (0.5). Chocolate = 3/8 and caramel = 1/8, both smaller than ½, so mint has the best chance.

10. Mere flips a coin 20 times and gets 12 heads and 8 tails. What fraction of her flips were tails? Was tails more or less common than expected?
    Tails came up 8 times out of 20 flips, so the fraction is 8/20 = 2/5 (which is 0.4). We would expect tails about ½ (0.5) of the time, so tails was a little less common than expected in this experiment.

11. A spinner has sections coloured red, blue and green. The probability of red is 1/4 and the probability of blue is 1/2. What is the probability of green? Explain how you know.
    All the probabilities must add up to 1. Red + blue = 1/4 + 1/2. Change 1/2 into 2/4, so 1/4 + 2/4 = 3/4. The rest must be green: 1 – 3/4 = 1/4. So the probability of green is 1/4.

12. Hemi rolls a dice 60 times. He records 6 appearing 18 times. The theoretical probability of rolling a 6 is 1/6. Roughly how many 6s would he expect in 60 rolls, and does his result suggest the dice might be unfair? Explain.
Expected 6s = 1/6 of 60 = 60 ÷ 6 = 10. Hemi actually got 18 sixes, which is much higher than the expected 10. Because 18 is well above 10, this suggests the dice might be weighted or unfair, favouring the number 6. (With a fair dice we would expect a number close to 10, though small differences are normal.)