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?

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.