GEOMETRY

A Complete Mathematics Worksheet Pack

Learn • Practise • Apply • Reason

CONCEPTS	SKILLS	APPLICATION
Explore 2D shapes, 3D solids, angles, lines and symmetry.	Identify properties, classify shapes, measure angles and reason spatially.	Use geometric thinking to solve puzzles and real-world problems.

Flexible, non-grade-specific mathematics resource

Includes shape properties, spatial reasoning and geometric challenges.

Name: _____

Date: _____

WORKSHEET 01 | Understanding 2D Shapes

Name: _____ Date: _____

A. Learn

A 2D shape is flat. It has length and width. Polygons are closed 2D shapes made from straight line segments.

B. Identify and classify

1) How many sides does a triangle have?
2) Name a polygon with 5 sides.
3) Name a polygon with 8 sides.
4) How many sides and vertices does a hexagon have?
5) Which of these is not a polygon: square, circle, pentagon?
6) What is a quadrilateral?
7) Name two quadrilaterals.

_____

C. Think

8) Can a shape have four sides but not be a square? Give an example.

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_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 02 | Properties of Triangles and Quadrilaterals

Name: _____ Date: _____

A. Learn

Shapes can be classified by their sides, angles and parallel lines. A triangle has three sides. A quadrilateral has four sides.

B. Practise

1) How many angles does a triangle have?
2) What is a triangle with all three sides equal called?
3) What is a triangle with one right angle called?
4) How many pairs of parallel sides does a rectangle have?
5) Name a quadrilateral with exactly one pair of parallel sides (in the usual inclusive school classification).
6) How many equal sides does a square have?
7) State one property shared by a square and a rectangle.

_____

C. Reason

8) Every square is a rectangle, but not every rectangle is a square. Explain why.

_____

_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 03 | Circles and Their Parts

Name: _____ Date: _____

A. Learn

A circle is a curved 2D shape. The centre is the point in the middle. A radius joins the centre to the circumference. A diameter passes through the centre and is twice the radius.

B. Practise

1) What is the name of the boundary of a circle?
2) A circle has radius 4 cm. Find its diameter.
3) A circle has diameter 18 cm. Find its radius.
4) How many radii make one diameter?
5) Does a circle have straight sides or vertices?
6) Draw a circle and label its centre, one radius and one diameter.

_____

C. Think

7) If the radius of a circle is doubled, what happens to its diameter?

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_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 04 | Understanding 3D Shapes

Name: _____ Date: _____

A. Learn

A 3D shape is a solid object with length, width and height. Solids may have flat faces, curved surfaces, edges and vertices.

B. Identify

1) How many faces does a cube have?
2) How many vertices does a cuboid have?
3) Which solid has one curved surface and no vertices: cone, sphere or cube?
4) How many flat circular faces does a cylinder have?
5) Name a solid with one circular base and one vertex.
6) How many edges does a cube have?
7) Which solid has 6 rectangular faces: cuboid or cone?

_____

C. Apply

8) Name a real-life object shaped like a sphere, cylinder and cuboid.

_____

_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 05 | Nets and Views of 3D Solids

Name: _____ Date: _____

A. Learn

A net is a flat pattern that can be folded to make a 3D solid. Different views show a solid from the front, side or above.

B. Practise

1) How many squares are needed in a net of a cube?
2) What 3D solid can be made from a net of six equal squares arranged correctly?
3) Which 2D shape might you see when looking directly at the circular end of a cylinder?
4) What shape is the top view of a cone when viewed from directly above?
5) A cuboid has 6 faces. How many faces meet at each vertex?
6) Sketch one possible net of a cube.

_____

C. Reason

7) Why will some arrangements of six squares not fold into a cube?

_____

_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 06 | Lines, Parallel and Perpendicular

Name: _____ Date: _____

A. Learn

A line extends endlessly in both directions. A line segment has two endpoints. Parallel lines never meet. Perpendicular lines meet at a right angle (90°).

B. Identify

1) What is the name for lines that never meet and stay the same distance apart?
2) What angle is formed by perpendicular lines?
3) Are the opposite edges of a rectangle parallel?
4) How many endpoints does a line segment have?
5) Do the hands of a clock at 3 o'clock form perpendicular lines?
6) Give one real-life example of parallel lines and one of perpendicular lines.

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C. Think

7) Can two lines be both parallel and perpendicular? Explain.

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Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 07 | Angles and Their Types

Name: _____ Date: _____

A. Learn

An angle is formed when two rays meet at a common endpoint called the vertex. An acute angle is less than 90°, a right angle is 90°, an obtuse angle is greater than 90° but less than 180°, and a straight angle is 180°.

B. Classify

1) Classify 35°.
2) Classify 90°.
3) Classify 125°.
4) Classify 180°.
5) Is 75° acute or obtuse?
6) Is 150° acute or obtuse?
7) Find the missing angle on a straight line if one angle is 68°.

_____

C. Calculate

8) Two angles make a right angle. One is 37°. Find the other.
9) Two angles on a straight line are 112° and x°. Find x.

_____

_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 08 | Symmetry and Patterns

Name: _____ Date: _____

A. Learn

A line of symmetry divides a shape into two matching halves that are reflections of each other. A shape can have zero, one or several lines of symmetry.

B. Practise

1) How many lines of symmetry does a square have?
2) How many lines of symmetry does a non-square rectangle have?
3) How many lines of symmetry does an equilateral triangle have?
4) Does a scalene triangle have a line of symmetry?
5) Name a capital letter with vertical line symmetry.
6) Draw a shape with exactly one line of symmetry.

_____

C. Reason

7) Can a shape have rotational symmetry but no line symmetry? Give an example if you can.

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Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 09 | Coordinates and Position

Name: _____ Date: _____

A. Learn

Coordinates describe the position of a point on a grid. The first number is the horizontal position (x-coordinate); the second is the vertical position (y-coordinate). Write coordinates as (x, y).

B. Practise

1) In the point (3, 5), what is the x-coordinate?
2) In the point (3, 5), what is the y-coordinate?
3) Write the coordinates of a point 4 units right and 2 units up from the origin.
4) A point moves from (2, 3) to (5, 3). How many units and in which direction did it move?
5) A point at (1, 2) moves 3 units up. What are its new coordinates?
6) Which point is higher: (2, 6) or (5, 4)?

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C. Think

7) What happens to the position of a point if its x-coordinate changes but its y-coordinate stays the same?

_____

_____

Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 10 | Geometry in Everyday Life

Name: _____ Date: _____

A. Solve

1) A rectangular noticeboard is 120 cm long and 80 cm wide. Find its perimeter.
2) A square tile has side 15 cm. Find its area.
3) A triangular road sign has three sides of 40 cm each. Find its perimeter.
4) A circular table has diameter 1.2 m. Find its radius.
5) A box is shaped like a cuboid. Name the 3D shape of each flat face if the box is not a cube.
6) A room corner forms what type of angle?

B. Explain

7) Give two examples of where geometry is used in buildings, design, art or nature.

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Show your working and explain your geometric reasoning wherever needed.

WORKSHEET 11 | Geometry Detective: Reasoning and Challenge

Name: _____ Date: _____

A. Solve the clues

1) I am a quadrilateral with four equal sides and four right angles. Who am I?
2) I have 5 faces, 8 edges and 5 vertices. Which solid am I?
3) An angle is 3 times another angle. Together they make 120°. Find both angles.
4) A rectangle has perimeter 34 cm and length 10 cm. Find its width.
5) A triangle has angles 45° and 65°. Find the third angle.

B. Challenge

6) Draw or describe a 2D shape with exactly one pair of parallel sides and no right angles.
7) A cube is painted on all its faces and then cut into 8 equal smaller cubes. How many small cubes have exactly three painted faces?
8) Create a geometry riddle using at least three properties of a shape and provide its answer.

Show your working and explain your geometric reasoning wherever needed.

TEACHER ANSWER KEY

Suggested answers. Accept correct diagrams, equivalent descriptions and clearly explained reasoning.

Worksheet 1

1) 3 2) Pentagon 3) Octagon 4) 6 sides and 6 vertices 5) Circle 6) A polygon with four sides 7) e.g. square, rectangle, rhombus, trapezium 8) e.g. rectangle, rhombus or trapezium.

Worksheet 2

1) 3 2) Equilateral triangle 3) Right-angled triangle 4) 2 pairs 5) Trapezium/trapezoid (one pair of parallel sides) 6) 4 7) Both have four right angles and opposite sides parallel/equal 8) A rectangle need not have all four sides equal.

Worksheet 3

1) Circumference 2) 8 cm 3) 9 cm 4) 2 5) No straight sides or vertices 6) Correct labelled diagram 7) The diameter also doubles.

Worksheet 4

1) 6 2) 8 3) Sphere 4) 2 5) Cone 6) 12 7) Cuboid 8) e.g. ball, can, cereal box.

Worksheet 5

1) 6 2) Cube 3) Circle 4) Circle 5) 3 6) Any valid cube net 7) Some arrangements overlap or cannot close all six faces without gaps.

Worksheet 6

1) Parallel lines 2) 90° 3) Yes 4) 2 5) Yes 6) e.g. railway tracks; corner of a book 7) No; parallel lines do not meet, while perpendicular lines meet.

Worksheet 7

1) Acute 2) Right 3) Obtuse 4) Straight 5) Acute 6) Obtuse 7) 112° 8) 53° 9) 68°.

Worksheet 8

1) 4 2) 2 3) 3 4) No 5) e.g. A, H, M, T, U, V, W, Y (depending on font) 6) Correct drawing 7) Yes; e.g. a non-square parallelogram has 180° rotational symmetry and no reflection symmetry.

Worksheet 9

1) 3 2) 5 3) (4, 2) 4) 3 units right 5) (1, 5) 6) (2, 6) 7) The point moves horizontally; its vertical position stays the same.

Worksheet 10

1) 400 cm 2) 225 cm^2 3) 120 cm 4) 0.6 m 5) Rectangles 6) Right angle 7) Answers vary; e.g. roof trusses, floor tiles, artwork, bridges.

Worksheet 11

1) Square 2) Square-based pyramid 3) 30° and 90° 4) 7 cm 5) 70° 6) e.g. a non-right-angled trapezium 7) 8 small cubes 8) Answers vary; riddle should have one defensible answer.