Unit 15 · Plane Shapes

HARDER PRACTICE QUESTIONS

Full marks 34

Write your answers on separate paper. Give a reason for each answer. Use a ruler, a protractor, set squares and squared paper where they help. The three angles of a triangle add up to 180°.

1 Possible or not? [5]

Can a triangle be each of these? If it can, describe one. If it can't, say why not.

i. right-angled and equilateral
ii. obtuse-angled and isosceles
iii. right-angled and isosceles
iv. a triangle with two obtuse angles
v. scalene, with one angle of 60°

2 Spot the error [3]

Shruti measured the angles of a triangle with a protractor and wrote 48°, 75° and 67°.

i. How can you tell, without seeing the triangle, that at least one of her measurements is wrong?
ii. If 48° and 67° are right, what should the third angle be?
iii. Suppose only one of her three angles is wrong. Whichever one it is, what kind of triangle is it by its angles?

3 Angles of a parallelogram [3]

In a parallelogram, opposite angles are equal, and two angles next to each other add up to 180°.

i. One angle of a parallelogram is 65°. Find the other three.
ii. In another parallelogram, one angle is twice the angle next to it. Find all four angles.
iii. Srijan says he drew a parallelogram with angles of 70°, 110°, 70° and 100°. Can that be right?

4 Which names fit? [4]

Copy and complete the table. Put a ✓ where the shape always has the property, and a ✗ where it need not.

Property	Square	Rectangle	Rhombus	Parallelogram	Trapezium
All four sides equal					
All four angles 90°					
Opposite sides equal					
Both pairs of opposite sides parallel					
Only one pair of opposite sides parallel					

Which shape has a ✓ in every row but the last?

5 True or false? [4]

Say whether each is true or false, and give a reason or a drawing.

i. Every rectangle is a parallelogram.
ii. Every rhombus is a square.
iii. A trapezium can have a right angle.
iv. A parallelogram can have exactly one right angle.

6 One wire, many shapes [4]

Samikshya has a piece of wire 36 cm long. She bends all of it into a shape each time.

i. How long is each side of an equilateral triangle made of it?
ii. How long is each side of a square made of it?
iii. She pushes the square over into a rhombus that is not a square. How long are its sides now?
iv. She makes a rectangle whose length is twice its breadth. Find its length and breadth.

7 On squared paper [4]

On squared paper, mark a point A where grid lines cross. B is 5 squares to the right of A. C is 3 squares right and 4 squares up from B, and D is 3 squares right and 4 squares up from A. Join ABCD.

i. Measure the four sides with a ruler. What do you find?
ii. What is the best name for ABCD?
iii. Measure $\angle DAB$ and $\angle ABC$.
iv. Draw your own trapezium on squared paper with exactly two right angles.

8 Think: triangles in a square [4]

Draw a square ABCD with sides 4 cm and join both its diagonals, AC and BD. They cross at O.

i. How many triangles can you find in the figure? Name them.
ii. Measure the sides and angles of $\triangle AOB$. Name it by its sides and by its angles.
iii. Do the same for $\triangle ABC$.

9 Think: make the frame stiff [3]

A frame of sticks with three sides can't change its shape, but one with four sides can be pushed over. A stick from corner to corner, a diagonal, cuts the four-sided frame into two triangles and makes it stiff.

i. A frame has five sides. How few diagonals, all from one corner, make it stiff? How many triangles does that make?
ii. Do the same for a frame with six sides.
iii. Find a rule: how many diagonals for a frame with 10 sides?