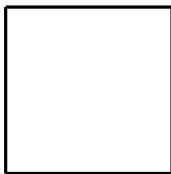


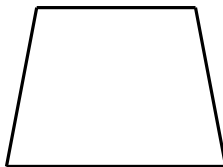
GRADE 7

QUADRILATERALS & POLYGONS

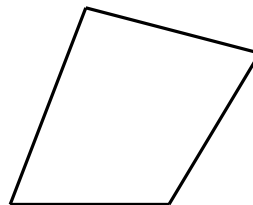
Complete Printable Worksheet Pack



Square



Rectangle



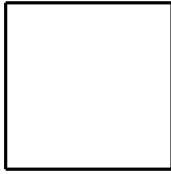
Parallelogram

6 Worksheets	Separate Answer Keys
Quadrilateral Properties	Special Quadrilaterals
Angles & Regular Polygons	Real-Life & Challenge Problems

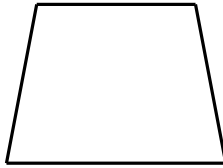
A4 printable • International Grade 7 level

Worksheet 1: Quadrilateral Properties

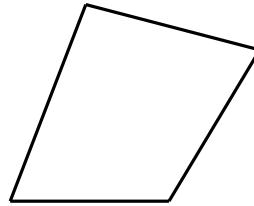
Show your working and use correct units where appropriate.



Square



Rectangle



Parallelogram

1. State the sum of the interior angles of any quadrilateral.
2. Classify a quadrilateral with four equal sides and four right angles.
3. A parallelogram has one angle of 68° . Find all four angles.
4. A rectangle has length 14 cm and width 9 cm. Find its perimeter and area.
5. A rhombus has side length 7.5 cm. Find its perimeter.
6. A square has side length 12 cm. Find its perimeter and area.
7. A parallelogram has base 15 cm, side 9 cm and perpendicular height 6 cm. Find its perimeter and area.
8. A quadrilateral has angles 82° , 96° , 71° and x° . Find x .
9. Explain one key difference between a rhombus and a square.
10. A quadrilateral has both pairs of opposite sides parallel. Name the most general classification.

Answer Key 1: Quadrilateral Properties

Equivalent correct methods are acceptable.

1. 360°
2. Square
3. 68° , 112° , 68° , 112°
4. Perimeter 46 cm; area 126 cm^2
5. 30 cm
6. Perimeter 48 cm; area 144 cm^2
7. Perimeter 48 cm; area 90 cm^2
8. $x=111^\circ$
9. A square has four right angles; a rhombus need not have right angles.
10. Parallelogram

Worksheet 2: Special Quadrilaterals & Symmetry

Show your working and use correct units where appropriate.

1. How many lines of symmetry does a square have?
2. How many lines of symmetry does a rectangle that is not a square have?
3. How many lines of symmetry does a rhombus that is not a square have?
4. State whether a square is also a rectangle and a rhombus. Explain.
5. A kite has two pairs of adjacent equal sides. Is it necessarily a parallelogram? Explain.
6. A parallelogram has side lengths 12 cm and 8 cm. Find its perimeter.
7. A rhombus has perimeter 52 cm. Find the length of each side.
8. A rectangle has area 180 cm^2 and length 15 cm. Find its width and perimeter.
9. A square and rectangle both have perimeter 40 cm. The square has side 10 cm; the rectangle has length 12 cm. Find the rectangle's width and compare their areas.
10. Name a quadrilateral with exactly one pair of parallel sides.

Answer Key 2: Special Quadrilaterals & Symmetry

Equivalent correct methods are acceptable.

1. 4

2. 2

3. 2

4. Yes. A square has four right angles and four equal sides, so it satisfies both definitions.

5. No. A kite does not have to have opposite sides parallel.

6. 40 cm

7. 13 cm

8. Width 12 cm; perimeter 54 cm

9. Rectangle width 8 cm; square area 100 cm^2 ; rectangle area 96 cm^2 .

10. Trapezium/trapezoid

Worksheet 3: Angles in Quadrilaterals & Polygons

Show your working and use correct units where appropriate.

Polygon / quadrilateral reference



1. Find the missing angle in a quadrilateral with angles 85° , 110° , 75° and x° .
2. A parallelogram has consecutive angles $(3x+5)^\circ$ and $(2x+25)^\circ$. Find x .
3. A quadrilateral has angles $2x^\circ$, $3x^\circ$, $4x^\circ$ and 90° . Find x and the angles.
4. Find the sum of the interior angles of a pentagon.
5. Find the sum of the interior angles of a hexagon.
6. A regular pentagon has equal interior angles. Find each interior angle.
7. A regular hexagon has equal interior angles. Find each interior angle.
8. A regular octagon has equal exterior angles. Find each exterior angle and interior angle.
9. A polygon has interior-angle sum $1,260^\circ$. How many sides does it have?
10. Explain why the interior-angle sum of an n -sided polygon is $(n-2) \times 180^\circ$.

Answer Key 3: Angles in Quadrilaterals & Polygons

Equivalent correct methods are acceptable.

1. 90°
2. $3x+5 + 2x+25=180 \rightarrow x=30$; angles 95° and 85°
3. $x=30$; angles $60^\circ, 90^\circ, 120^\circ, 90^\circ$
4. 540°
5. 720°
6. 108°
7. 120°
8. Exterior 45° ; interior 135°
9. $(n-2)180=1260 \rightarrow n=9$
10. A polygon can be divided into $n-2$ non-overlapping triangles from one vertex; each triangle has angle sum 180° .

Worksheet 4: Regular Polygons & Perimeters

Show your working and use correct units where appropriate.

1. Find the perimeter of a regular pentagon with side length 8.4 cm.
2. Find the perimeter of a regular hexagon with side length 6.5 cm.
3. A regular octagon has perimeter 72 cm. Find each side.
4. A regular decagon has side length 4.8 cm. Find its perimeter.
5. A regular polygon has 12 sides and perimeter 102 cm. Find each side.
6. A regular polygon has exterior angle 30° . How many sides does it have?
7. A regular polygon has 15 sides. Find each exterior angle.
8. A regular polygon has 10 sides. Find each interior angle.
9. A regular polygon has each interior angle 150° . How many sides does it have?
10. A regular polygon has 18 sides and each side is 3.5 cm. Find its perimeter.

Answer Key 4: Regular Polygons & Perimeters

Equivalent correct methods are acceptable.

1. 42 cm
2. 39 cm
3. 9 cm
4. 48 cm
5. 8.5 cm
6. 12 sides
7. 24°
8. 144°
9. 12 sides
10. 63 cm

Worksheet 5: Polygons in Real Life & Applications

Show your working and use correct units where appropriate.

1. A stop sign is a regular octagon. If each side is 30 cm, find its perimeter.
2. A rectangular garden is 28 m by 17 m. Find the perimeter and area.
3. A square courtyard has side 18 m. A path is built around its outside edge. If the path adds 2 m to each side length, find the new perimeter.
4. A regular hexagonal table has side length 1.2 m. Find its perimeter.
5. A trapezium has parallel sides 12 m and 20 m and height 7 m. Find its area.
6. A parallelogram-shaped sign has base 2.5 m and perpendicular height 1.8 m. Find its area.
7. A rhombus has diagonals 10 m and 16 m. Find its area using $\frac{1}{2} \times d_1 \times d_2$.
8. A kite has diagonals 14 cm and 9 cm. Find its area.
9. A regular pentagonal flower bed has side length 4 m. Fencing costs \$18 per metre. Find the fencing cost.
10. A floor is shaped like a rectangle $12\text{ m} \times 8\text{ m}$ with a $4\text{ m} \times 3\text{ m}$ rectangular section attached along one full side. Find the total area.

Answer Key 5: Polygons in Real Life & Applications

Equivalent correct methods are acceptable.

1. 240 cm
2. Perimeter 90 m; area 476 m²
3. New side 20 m; new perimeter 80 m
4. 7.2 m
5. 112 m²
6. 4.5 m²
7. 80 m²
8. 63 cm²
9. Perimeter 20 m; cost \$360
10. $96+12=108$ m²

Worksheet 6: Quadrilaterals & Polygons Challenge

Show your working and use correct units where appropriate.

1. A parallelogram has angles in the ratio 2:3 for two consecutive angles. Find all four angles.
2. A quadrilateral has angles $2x^\circ$, $3x^\circ$, $5x^\circ$ and $8x^\circ$. Find x and all angles.
3. A regular polygon has each exterior angle 20° . Find its number of sides and each interior angle.
4. A regular polygon has 15 sides. Find the sum of its interior angles and each interior angle.
5. A quadrilateral has side lengths 8 cm, 11 cm, 13 cm and 16 cm. Find its perimeter. Can you determine its area from this information alone? Explain.
6. A rectangle and square have the same area of 144 cm^2 . Find the square's perimeter. Give one possible rectangle with a different perimeter.
7. A rhombus has diagonals 12 cm and 16 cm. Find its area. If each side is 10 cm, find its perimeter.
8. A regular polygon has each interior angle 156° . Find its exterior angle and number of sides.
9. A trapezium has parallel sides 14 cm and 22 cm and height 9 cm. Find its area. If its other sides are 10 cm and 12 cm, find its perimeter.
10. A polygon has 12 sides. Five of its interior angles are 140° each and the remaining seven angles are equal. Find each of the remaining seven angles.

Answer Key 6: Quadrilaterals & Polygons Challenge

Equivalent correct methods are acceptable.

1. $2k+3k=180 \rightarrow k=36$; angles $72^\circ, 108^\circ, 72^\circ, 108^\circ$
2. $18x=360 \rightarrow x=20$; angles $40^\circ, 60^\circ, 100^\circ, 160^\circ$
3. $360/20=18$ sides; interior angle 160°
4. $\text{Sum}=(15-2)180=2340^\circ$; each $=156^\circ$
5. Perimeter 48 cm. No; side lengths alone do not determine a unique quadrilateral area.
6. Square side 12 cm; perimeter 48 cm. Example rectangle 8×18 has area 144 cm^2 and perimeter 52 cm.
7. Area $=96 \text{ cm}^2$; perimeter $=40 \text{ cm}$
8. Exterior $=24^\circ$; sides $=15$
9. Area $=\frac{1}{2}(14+22) \times 9 = 162 \text{ cm}^2$; perimeter $=58 \text{ cm}$
10. Total sum $=(12-2)180=1800^\circ$. Five angles contribute 700° , leaving 1100° ; each of seven $= 1100/7 = 157 \frac{1}{7}^\circ$.