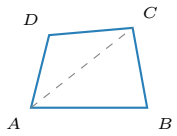
Quadrilaterals

Prepared by Nikolas Agisilaou

What is a Quadrilateral?

A closed, flat shape with **4 straight sides**, 4 vertices, and 4 interior angles.



Angle Sum

$$\angle A + \angle B + \angle C + \angle D = 360^\circ$$

Why? One diagonal → two triangles.
$2 \times 180^\circ = 360^\circ$

Example: Angles 78°, 116°, 63°, x:
$x = 360^\circ - 257^\circ = \mathbf{103^\circ}$

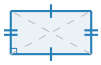
The Six Special Quadrilaterals

Square



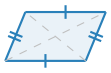
All sides equal, all 90°
Diags equal, bisect at 90°
4 sym. lines · rot. order 4

Rectangle



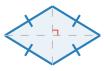
Opp. sides equal, all 90°
Diags equal, bisect (not 90°)
2 sym. lines · rot. order 2

Parallelogram



Opp. sides equal & parallel
Diags bisect (not equal)
0 sym. lines · rot. order 2

Rhombus



All sides equal, opp. ∠s equal
Diags bisect at 90°
2 sym. lines · rot. order 2

Trapezium



Exactly 1 pair parallel sides
Co-interior ∠s → 180°
0 sym. lines · rot. order 1

Kite



2 pairs adjacent sides equal
Axis diag bisects other at 90°
1 sym. line · rot. order 1

The Panda Math Tutor

Properties at a Glance

Property	Square	Rect.	Paral.	Rhombus	Trap.	Kite
All sides equal	✓	×	×	✓	×	×
Opp. sides parallel	✓	✓	✓	✓	1 pair	×
All angles 90°	✓	✓	×	×	×	×
Opp. angles equal	✓	✓	✓	✓	×	1 pair
Diags equal length	✓	✓	×	×	×	×
Diags halve each other	✓	✓	✓	✓	×	×
Diags meet at 90°	✓	×	×	✓	×	✓
Lines of symmetry	4	2	0	2	0 or 1	1
Rot. symmetry order	4	2	2	2	1	1

Common Traps

1. Every square **is** a rectangle, rhombus, and parallelogram — not the reverse.
2. A parallelogram has **no** lines of symmetry — don't confuse it with a rectangle.
3. In a kite only **one** pair of opposite ∠s is equal, not both pairs.

Quick Exam Tips

Isosceles trapezium: 1 symmetry line, equal diags, equal base ∠s.

Co-interior ∠s: Same-side angles between parallel lines total 180°.

Hierarchy: Square ⊂ Rect. ⊂ Paral. ⊂ Quadrilateral.