Unit 7 · Quadrilaterals and Polygons Cheat Sheet

Unit 7 focus: polygon angle sums and the properties of quadrilaterals

1 KEY VOCABULARY

parallelogram	Quadrilateral with both pairs of opposite sides parallel.	$AB \parallel DC$
rhombus	Parallelogram with four congruent sides.	diagonals are perpendicular
trapezoid	Quadrilateral with exactly one pair of parallel sides.	bases and legs
kite	Two pairs of adjacent congruent sides.	diagonals are perpendicular

2 POLYGON ANGLE SUMS

Sides	Interior angle sum
3	180°
4	360°
5	540°
n	$(n-2)\cdot 180^\circ$

The exterior angles of any convex polygon add to 360°.

3 INTERIOR ANGLE SUM

Use $(n-2)\cdot 180$.

Example: Find the interior angle sum of a hexagon.
Sides: $n = 6$
Multiply: $(6-2)\cdot 180$
Answer: 720°

4 REGULAR POLYGONS

Each exterior angle is $\frac{360}{n}$. Each interior angle is 180 minus that.

Example: A regular octagon: find one exterior and one interior angle.
Exterior: $\frac{360}{8} = 45$
Interior: $180 - 45$
Answer: exterior 45°, interior 135°

5 PARALLELOGRAM PROPERTIES

- Opposite sides are parallel and congruent.
- Opposite angles are congruent.
- Consecutive angles are supplementary (add to 180°).
- The diagonals bisect each other.

6 QUICK REMINDERS & COMMON MISTAKES

✔ Do remember

- Count the sides to find n first.
- Consecutive angles of a parallelogram add to 180°.
- Exterior angles add to 360° for every convex polygon.

✘ Common mistakes

- Using $n \cdot 180$: subtract 2 from n first
- Thinking diagonals of every parallelogram are congruent: only in a rectangle
- Calling every trapezoid a parallelogram: a trapezoid has only one pair of parallel sides

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More practice: parallelograms, rectangles, rhombuses, trapezoids, kites and coordinate proofs

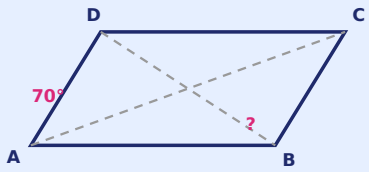
1 SPECIAL PARALLELOGRAMS

Shape	Extra properties
rectangle	four right angles; diagonals congruent
rhombus	four congruent sides; diagonals perpendicular and bisect the angles
square	all of the above: a rectangle and a rhombus

2 ANGLES IN A PARALLELOGRAM

Consecutive angles are supplementary; opposite angles are equal.

Example: $\angle A = 70^\circ$. Find $\angle B$ (next to A).
Subtract: $180 - 70$
Answer: $\angle B = 110^\circ$



3 ALGEBRA WITH SIDES

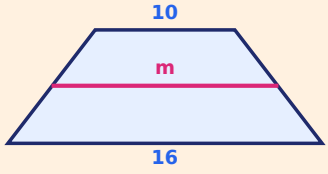
Opposite sides are congruent. Set them equal and solve.

Example: Opposite sides: $3x + 1$ and $2x + 6$.
Set equal: $3x + 1 = 2x + 6$
Solve: $x = 5$
Substitute: $3(5) + 1$
Answer: each side is 16

4 TRAPEZOID MIDSEGMENT

The midsegment is parallel to the bases and its length is the mean of the bases.

Example: The bases are 10 and 16. Find the midsegment m.
Average: $m = \frac{10+16}{2}$
Answer: $m = 13$



5 RHOMBUS DIAGONALS

The diagonals are perpendicular and bisect each other, so half-diagonals are the legs of a right triangle.

Example: Diagonals are 6 and 8. Find the side and the area.
Half-diagonals 3 and 4: $3^2 + 4^2 = 25$
Area: $\frac{6 \cdot 8}{2}$
Answer: side 5**, area** 24

6 CHECK YOURSELF

- Did I use $(n - 2) \cdot 180$ for the interior sum?
- Is the shape a parallelogram first, then a special one?
- Did I check slopes for parallel and distances for equal sides?
- Do the answers fit the figure (angles add to 360°)?