Grade 6 Mathematics: Geometry and Transformations

Free sample lesson

Ontario curriculum: Mathematics (2020), Strand E: Spatial Sense, E1 Geometric and Spatial Reasoning. 17 days.

From unitplans.ca. For classroom use by the purchasing teacher. Please do not share or resell.

This is Lesson 1 of 12 from the full unit, exactly as it appears in the Teacher Guide, followed by the student worksheet. The full unit is at unitplans.ca.

unitplans.ca

Lesson 1: Sides and angles of quadrilaterals

1 day · about 60 minutes · E1.1

Learning goal

- We are learning to describe quadrilaterals by looking at their sides and angles.

Success criteria

- I can count pairs of parallel sides and right angles in a quadrilateral.
- I can use marks on a diagram to tell which sides are equal.
- I can find a missing angle because the four angles add to 360°.
- I can spot a reflex angle.

Materials

- Geoboards or dot paper
- Rulers and protractors
- Sets of quadrilateral cut-outs (square, rectangle, parallelogram, rhombus, kite, trapezoid, dart)

Minds On (10 min)

1. Hold up the seven cut-outs. Students sort them any way they like into two groups and name their rule.
2. Collect rules such as has a slanted side and push toward mathematical words. Ask: "Name two things that are true for every rectangle."

Action (35 min)

1. Model reading marks: arrows mean parallel, tick marks mean equal length, a small square means a right angle.
2. In pairs, students describe each cut-out using sides (equal? parallel?) and angles (right? reflex?). They record one fact per shape.
3. Show that the four angles of any quadrilateral add to 360° by tearing off the corners of one and fitting them around a point.
4. Students complete the worksheet.

Consolidation (15 min)

1. Discuss question 3: how did the tick marks help name the shape?

unitplans.ca

2. Remind students that Ontario classes use an inclusive trapezoid: at least one pair of parallel sides.
3. Exit: "Name one quadrilateral that has two pairs of parallel sides."

Questions to ask

- What do the arrows on the sides tell you?
- How could you check a corner is a right angle without a protractor?
- Where is the reflex angle, and how do you know it is more than 180°?

Watch for

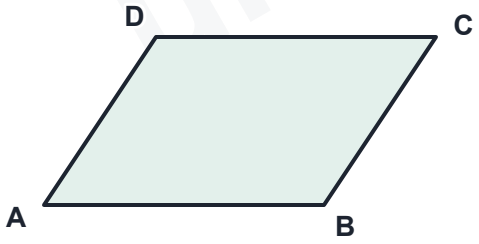
- Students think parallel sides must be the same length. Show a trapezoid with parallel sides of different lengths.
- Students think a reflex angle is "inside out" or not an angle. Measure it as the turn the long way around.

Differentiation

Support	Extend
Provide a corner of paper as a right-angle checker. Use cut-outs with the parallel sides already coloured.	Find a quadrilateral with exactly one right angle and sketch it.

Answer key: Sides and angles

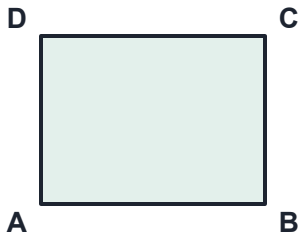
1. Count the pairs of parallel sides in parallelogram ABCD.



unitplans.ca

> **Answer:** 2 pairs
> Opposite sides run the same direction and never meet.

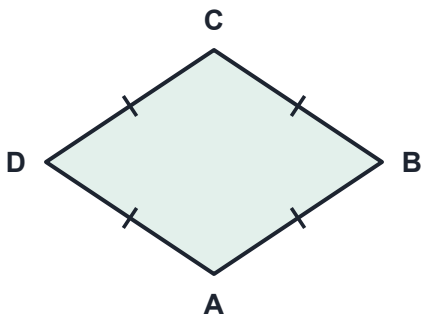
2. How many right angles does rectangle ABCD have?



unitplans.ca

> **Answer:** 4 right angles

3. The tick marks show equal sides. What can you say about the sides of quadrilateral ABCD, and what is its name?



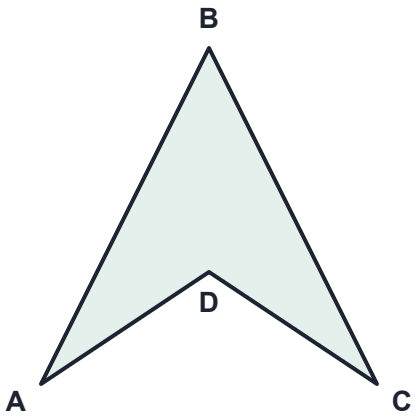
unitplans.ca

> **Answer:** All four sides are equal, so it is a rhombus. It also has 2 pairs of parallel sides, so it is a parallelogram too.

4. Three angles of a quadrilateral are 85°, 110° and 70°. Find the fourth angle.

> **Answer:** 95°
> 360 − (85 + 110 + 70) = 95

5. Quadrilateral ABCD has one angle larger than 180°. Which vertex has the reflex angle, and what is this shape called?



unitplans.ca

> **Answer:** Angle D is the reflex angle. The shape is a dart.

6. A classmate says a parallelogram cannot be a trapezoid. Do you agree? Explain.

> **Answer:** No. In Ontario a trapezoid has at least one pair of parallel sides. A parallelogram has two pairs, so it is also a trapezoid.

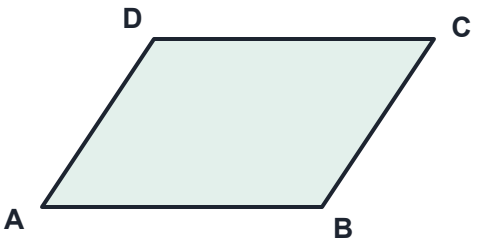
Student worksheet: Sides and angles

Success criteria

- I can count pairs of parallel sides and right angles in a quadrilateral.
- I can use marks on a diagram to tell which sides are equal.
- I can find a missing angle because the four angles add to 360°.
- I can spot a reflex angle.

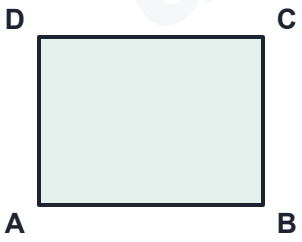
Marks on a diagram: arrows mean parallel, ticks mean equal length, a small square means a right angle. Show your thinking.

1. Count the pairs of parallel sides in parallelogram ABCD.



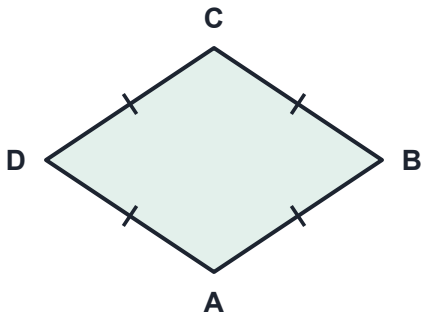
unitplans.ca

2. How many right angles does rectangle ABCD have?



unitplans.ca

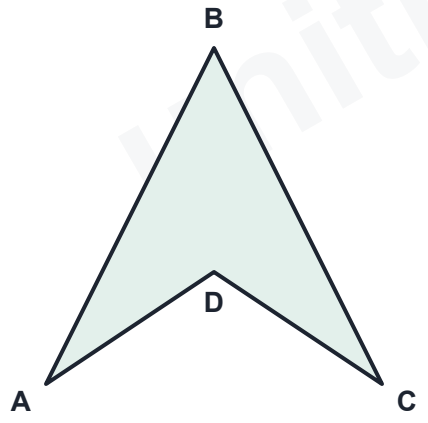
3. The tick marks show equal sides. What can you say about the sides of quadrilateral ABCD, and what is its name?



unitplans.ca

4. Three angles of a quadrilateral are 85°, 110° and 70°. Find the fourth angle.

5. Quadrilateral ABCD has one angle larger than 180°. Which vertex has the reflex angle, and what is this shape called?



unitplans.ca

6. A classmate says a parallelogram cannot be a trapezoid. Do you agree? Explain.

unitplans.ca