

Grade 4 • Unit 8 • Assessment Guide

Properties of Two-dimensional Shapes

For the Parent or Teacher — What to look for

Unit 8 classifies shapes by attributes (side lengths, angles, symmetry) and uses these for perimeter problems. The HARDEST concept is the CLASSIFICATION HIERARCHY — a square IS a rectangle and a rhombus; a rhombus is NOT always a square. Watch for students who treat categories as mutually exclusive.

Problem 1 — Two right angles in a triangle?

- NO. Triangle angles sum to 180° . Two right angles = 180° , leaves 0° . Impossible.
- Right + obtuse: also impossible ($90 + >90 > 180$).
- ★ Strong: appeals to 180° sum (or 'no room left').
- Weak: 'maybe' / can't reason through it.

Problem 2 — Sketch three triangle types

- Acute: all angles look $< 90^\circ$. Right: clear square-corner. Obtuse: clear angle $> 90^\circ$.
- Strong: visibly different; right triangle with clear 90° .
- Weak: all three look similar.

Problem 3 — Properties of quadrilaterals

- 4 right angles: square, rectangle.
- 4 equal sides: square, rhombus.
- 2 pairs of parallel sides: square, rectangle, rhombus, parallelogram.
- At least 1 pair: all of the above PLUS trapezoid.
- ★ Strong: handles the hierarchy — knows squares belong in multiple categories.
- Weak: lists each shape in only ONE category (treats them as mutually exclusive).

Problem 4 — Square IS a rectangle?

- Mai is right. A square has 4 right angles AND 4 equal sides — meets the rectangle definition PLUS more.
- ★ Strong: explains via the definition.
- Weak: sides with Lin — treats them as separate categories.

Problem 5 — Every rhombus is a square?

- FALSE. A rhombus has 4 equal sides but doesn't have to have right angles.
- ★ Strong: gives a counterexample (a 'diamond' shape).
- Weak: 'true' (gets the relationship backward).

Problem 6 — Lines of symmetry

- Equilateral triangle: 3. Square: 4. Letter A: 1 (vertical). Letter S: 0 (rotational symmetry, not line).
- ★ Strong: catches S has 0 lines.
- Weak: says S has horizontal line of symmetry; or gives square only 2.

Problem 7 — Every rectangle has 4 lines?

- WRONG. A non-square rectangle has only 2 lines of symmetry. A square has 4 because all sides are equal.
- ★ Strong: distinguishes square from non-square rectangle.
- Weak: agrees with Diego — confuses square with rectangle.

Problem 8 — Rectangle perimeter 36, one side 10

- Other side: 8 cm. ($2(10) + 2(?) = 36 \rightarrow ? = 8.$)
- Strong: writes equation.
- Weak: $36 - 10 = 26$ (treats as if all sides equal).

Problem 9 — Rhombus perimeter 28

- 4 equal sides: $28 \div 4 = 7$ inches each.
- ★ Strong: uses 4-equal-sides property.
- Weak: divides by 2.

Problem 10 — Isosceles triangle perimeter 24, base 8

- Equal sides: $(24 - 8) \div 2 = 8$ cm each.
- Strong: subtracts base, divides by 2.
- Weak: $24 \div 3 = 8$ (treats as equilateral).

Problem 11 — Quadrilateral with one pair parallel + one pair perpendicular

- NOT a rectangle. A rectangle has TWO pairs of parallel sides AND four right angles. The shape described has only ONE pair parallel — could be a right trapezoid.
- ★ Strong: catches the 'one pair' detail.
- Weak: says 'yes, rectangle' without checking all properties.

Problem 12 — Sara's symmetric polygon claim

- Sara is WRONG. Counterexample: isosceles (non-equilateral) triangle has 1 line of symmetry but unequal sides. A rectangle (non-square) has 2 lines. A kite has line symmetry without equal sides.
- ★ Strong: gives a concrete counterexample.
- Weak: 'she's wrong' without an example.

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