

Grade 5 • Unit 7 • Assessment Guide

Shapes on the Coordinate Grid

For the Parent or Teacher — What to look for

Unit 7 introduces the coordinate grid and the hierarchy of two-dimensional shapes. The diagnostic is whether the student understands two crucial ideas: (1) the order of coordinates matters — (x, y) is right-then-up, not the other way; and (2) shapes form a HIERARCHY — a square is a special rectangle, a rectangle is a special parallelogram, etc. Both ideas trip students up.

Problem 1 — Plot 4 points

- A(3,5) is 3 right, 5 up. B(7,2) is 7 right, 2 up. C(0,4) is ON the y-axis. D(6,0) is ON the x-axis.
- ★ Strong: knows that C is on y-axis ($x = 0$) and D is on x-axis ($y = 0$).
- Weak: swaps x and y; or plots C and D in the wrong quadrant.

Problem 2 — Origin (0,0)

- Origin = (0, 0). It is the starting point where x-axis meets y-axis.
- Strong: 'It is where both coordinates are 0 — all measurements start there.'

Problem 3 — Mai's confusion about (4,7)

- Mai is WRONG. (4, 7) means 4 units to the RIGHT (x), then 7 units UP (y). She swapped.
- ★ Classic 'order of coordinates' error.
- Strong: 'X comes first, then Y. (4, 7) is 4 right, 7 up.'

Problem 4 — Hierarchy true/false

- (a) TRUE. (b) FALSE. (c) TRUE. (d) FALSE. (e) TRUE.
- ★ THE central hierarchy question.
- Strong explanation for (a) vs (b): 'A square HAS all rectangle properties (4 right angles), PLUS more (equal sides). So squares are a special kind of rectangle. But a rectangle that is not a square is not a square.'
- Weak: thinks (b) is true because they're 'similar.'

Problem 5 — Non-rectangle parallelogram

- Should draw a parallelogram that is tilted — opposite sides parallel and equal, but angles NOT 90° .
- ★ A rectangle is a parallelogram with right angles. The 'extra' property is the right angle.
- Strong: clear tilted parallelogram; identifies right-angle property as the missing piece.

Problem 6 — Square = rectangle + rhombus

- TRUE.
- Properties: 4 right angles (rectangle), 4 equal sides (rhombus), 4 sides (quadrilateral), opposite sides parallel (parallelogram), etc.
- ★ Strong: lists at least 3 distinct properties that show the square is in BOTH categories.
- ★ This is the deepest hierarchy question — a square is the INTERSECTION of rectangles and rhombuses.

Problem 7 — Triangle types

- Equilateral. Isosceles. Right.

- YES, a right isosceles triangle exists — two legs equal, one right angle (and the equal legs are the two legs of the right angle).
- ★ Strong: sketches a right isosceles triangle; weak: thinks right triangles must have all different sides.

Problem 8 — Rule 1 + Rule 2 pattern

- Rule 1: 0, 2, 4, 6, 8, 10. Rule 2: 0, 6, 12, 18, 24, 30.
- Each Rule-2 term is 3 TIMES the matching Rule-1 term.
- If Rule-1 term is 20, Rule-2 = 60.
- ★ Strong: notices the 3x relationship and extends it.
- Weak: only describes the patterns separately, does not relate them.

Problem 9 — Plot ordered pairs

- Pairs: (0,0), (2,6), (4,12), (6,18) — note (6,18) and beyond may go off a 10x10 grid; that is fine.
- The points lie ON A STRAIGHT LINE.
- ★ Strong: notices the linear pattern. Reveals the connection between patterns and graphs (preparing for Grade 6 ratios).
- Weak: plots correctly but does not see the line.

Problem 10 — Diego's hierarchy confusion

- Diego is WRONG.
- ★ Strong: 'A square has all rectangle properties PLUS more. Having more makes it a SPECIAL kind of rectangle — not a different category. Like how a Golden Retriever is still a dog.'
- Weak: agrees with Diego (treats categories as exclusive when they should be nested).

Problem 11 — Plot 4 points → rectangle

- Rectangle with sides 4 (horizontal, from $x=2$ to $x=6$) and 4 (vertical, from $y=3$ to $y=7$).
- It is actually a SQUARE (4×4). Area = 16 sq units.
- ★ Strong: realizes the figure is a square because both side lengths are equal. Computes side lengths by subtraction.
- Weak: just says 'rectangle' without noticing it is actually a square.

Problem 12 — Trapezoid that is a parallelogram

- YES, under the INCLUSIVE definition (at least one pair of parallel sides), every parallelogram IS a trapezoid (because it has parallel sides).
- ★ Strong: 'A parallelogram has TWO pairs of parallel sides, which counts as 'at least one pair.' So every parallelogram is a trapezoid.'
- Weak: thinks parallelograms and trapezoids are completely separate categories (which is the EXCLUSIVE definition — the textbook here uses the inclusive one).

— end —