

GRADE 6 · GEOMETRY · ANSWER KEY

DRAWING POLYGONS IN THE COORDINATE PLANE

Today's goal: I can draw polygons in the coordinate plane given coordinates for the vertices and use coordinates to graph points in all four quadrants of the coordinate plane.



How to use this key. Problem numbers match the student sheets. Each answer shows the steps and the slip Mr DJ sees most, so a wrong answer tells you what to reteach. Pepper levels: **Mild** warm-up, **Medium** stretch, **Spicy** challenge, **Extra Spicy** big brain.

Practice

8 problems + Mr DJ's worked example

Use: During the lesson after the deck. Items 7 and 8 are the two ideas most often left implicit: axes are not quadrants, and order/sign carry meaning. **Timing:** 15–25 min · pairs or independent · grid paper required. Circulate on 7–9. Item 4's lines-versus-spaces error is worth a whole-class aside.

- 1** Quadrant I **2** Quadrant II **3** Quadrant IV **4** 5 units **5** Isosceles — the two slanted sides match
6 $(-1, 4)$ **7** None — it lies ON the y-axis **8** No — Quadrant IV and Quadrant II respectively

1 **MILD** $(2, 7)$?

Quadrant I

1. Right 2, up 7. Both positive → Quadrant I.

Watch for: Plotted $(7, 2)$.

2 **MILD** $(-5, 3)$?

Quadrant II

1. Left 5, up 3 → Quadrant II.

Watch for: Went right, landing in Quadrant I.

3 **MEDIUM** $(4, -1)$?

Quadrant IV

1. Right 4, down 1 → Quadrant IV.

Watch for: Answered II by reading the negative as belonging to x.

4 **MEDIUM** Square $(2, 2)$, $(7, 2)$, $(7, 7)$, $(2, 7)$ — side length?

5 units

- From $(2, 2)$ to $(7, 2)$ the y stays the same, so count along x:
 $7 - 2 = 5$ units.
- All four sides are 5, so it is a square.

Watch for: Counted grid lines instead of spaces, giving 6.

5 **MEDIUM** Triangle $(0, 0)$, $(6, 0)$, $(3, 5)$?

Isosceles — the two slanted sides match

- The base runs from $(0, 0)$ to $(6, 0)$, 6 units long.
- The apex $(3, 5)$ sits directly above the midpoint of the base, since 3 is halfway between 0 and 6.
- Because the apex is centred, the two slanted sides are equal → isosceles.

Watch for: Called it equilateral. The slanted sides are longer than the base of 6, so all three cannot be equal.

6 **SPICY** Fourth vertex given $(-1, -2)$, $(4, -2)$, $(4, 4)$?

$(-1, 4)$

1. The x-values in use are -1 and 4 ; the y-values are -2 and 4 .
2. $(-1, -2)$ and $(4, -2)$ share $y = -2$. $(4, -2)$ and $(4, 4)$ share $x = 4$.
3. The missing corner pairs the leftovers: $x = -1$ with $y = 4 \rightarrow (-1, 4)$.
4. Check: it sits directly above $(-1, -2)$ and directly left of $(4, 4)$.

Watch for: Answered $(4, -1)$ by reversing, or $(-1, -4)$ by copying the wrong sign.

7 **SPICY** $(0, -4)$ — which quadrant?

None — it lies ON the y-axis

1. $x = 0$ means no movement left or right, so the point sits on the vertical axis.
2. Quadrants are the four regions BETWEEN the axes; a point on an axis is in none of them.
3. $(0, -4)$ is 4 units below the origin on the y-axis.

Watch for: Forced it into Quadrant III or IV. Any point with a zero coordinate is on an axis.

8 **EXTRA SPICY** $(3, -3)$ and $(-3, 3)$ — same point?

No — Quadrant IV and Quadrant II respectively

1. $(3, -3)$: right 3, down 3 $\rightarrow$ Quadrant IV.
2. $(-3, 3)$: left 3, up 3 $\rightarrow$ Quadrant II.
3. Swapping the signs reflects the point through the origin — it lands on the opposite side.
4. They are the same DISTANCE from the origin, which is why they look similar, but they are different points.

Watch for: Said yes because the same digits appear. The pair (x, y) is a position, not a set of numbers.

Homework

7 problems + Mr DJ's worked example

Use: Parallels the practice sheet. Item 5 asks for evidence from the coordinates, not from the picture — that habit is what the “Side lengths from coordinates” lesson formalises. **Timing:** ~15 min at home · independent · grid paper. Review item 4 as the next-day warm-up; crossing zero is the common slip.

1 Quadrant I

2 Quadrant II

3 Quadrant IV

4 6 units

5 A right triangle — two sides run along the grid and meet at a right angle

6 $(3, 7)$

7 None — it lies ON the x-axis

1 **MILD** $(6, 2)$?

Quadrant I

1. Right 6, up 2 $\rightarrow$ Quadrant I.

Watch for: Plotted $(2, 6)$.

2 **MILD** $(-3, 8)$?

Quadrant II

1. Left 3, up 8 $\rightarrow$ Quadrant II.

Watch for: Went right.

3 **MEDIUM** $(5, -6)$?

Quadrant IV

1. Right 5, down 6 $\rightarrow$ Quadrant IV.

Watch for: Answered II.

4 **MEDIUM** Rectangle $(-4, 1)$, $(2, 1)$, $(2, 5)$, $(-4, 5)$ — bottom side?

6 units

1. From $(-4, 1)$ to $(2, 1)$, y is unchanged, so measure along x.
2. The distance from -4 to 2 is $4 + 2 = 6$ units — count from -4 up to 0 , then 0 up to 2 .

Watch for: Answered 2 by subtracting the wrong way, or 4 by only counting to the origin.

5 **MEDIUM** Triangle (1,1), (1,6), (5,1)?

A right triangle — two sides run along the grid and meet at a right angle

1. (1, 1) and (1, 6) share $x = 1$, so that side is vertical, 5 units.
2. (1, 1) and (5, 1) share $y = 1$, so that side is horizontal, 4 units.
3. A vertical side meeting a horizontal side forms a right angle at (1, 1).
4. Shared x means vertical; shared y means horizontal — that is the tell straight from the coordinates.

Watch for: Guessed from the sketch without using the shared coordinates as evidence.

6 **SPICY** Fourth vertex given $(-2, -2)$, $(3, -2)$, $(-2, 7)$?

(3, 7)

1. The x -values in use are -2 and 3 ; the y -values are -2 and 7 .
2. $(-2, -2)$ and $(3, -2)$ share $y = -2$. $(-2, -2)$ and $(-2, 7)$ share $x = -2$.
3. The leftover pairing is $x = 3$ with $y = 7 \rightarrow (3, 7)$.
4. Check: directly above $(3, -2)$ and directly right of $(-2, 7)$.

Watch for: Answered $(7, 3)$ by reversing the pair.

7 **SPICY** $(-6, 0)$ — which quadrant?

None — it lies ON the x-axis

1. $y = 0$ means no movement up or down, so the point sits on the horizontal axis.
2. It is 6 units left of the origin.
3. Quadrants are the regions between the axes, so a point on an axis belongs to none.

Watch for: Forced it into Quadrant II or III.

Exit Ticket

4 problems

Use: End of the plotting lesson. 5–8 min, independent. Item 4 is the reasoning that the “Side lengths from coordinates” lesson will build on. **Timing:** 5–8 min · independent. Provide grid paper. A reversal on item 1 predicts trouble in the “Side lengths from coordinates” lesson.

1 **MILD** Plot $(3, 5)$ — quadrant?**Quadrant I**

1. Right 3, up 5. Both coordinates positive → Quadrant I.
2. Note $(5, 3)$ is a different point: right 5, up 3.

Watch for: Plotted $(5, 3)$ by reading the pair backwards. Always take x first.

2 **MILD** Plot $(-4, 2)$ — quadrant?**Quadrant II**

1. Negative x means LEFT 4; positive y means UP 2.
2. Left and up → Quadrant II.

Watch for: Went right 4 by ignoring the negative, landing in Quadrant I.

3 **MEDIUM** Rectangle $(1,1)$, $(6,1)$, $(6,4)$, $(1,4)$?**A 5-by-3 rectangle; connect in the order given and back to the start**

1. $(1, 1) \rightarrow (6, 1)$ is the bottom side, 5 units long.
2. $(6, 1) \rightarrow (6, 4)$ is the right side, 3 units tall.
3. $(6, 4) \rightarrow (1, 4)$ is the top; $(1, 4) \rightarrow (1, 1)$ closes it.
4. Connecting the vertices in order (not by jumping across) is what makes it a rectangle rather than a bow-tie.

Watch for: Connected the points in a criss-cross order, producing a crossed shape instead of a rectangle.

4 **SPICY** Fourth vertex given $(2,3)$, $(-3,3)$, $(2,-5)$? **$(-3, -5)$**

1. In a rectangle, opposite sides are parallel to the axes here, so vertices pair up by coordinate.
2. The x -values used are 2 and -3 ; the y -values used are 3 and -5 .
3. $(2, 3)$ and $(-3, 3)$ share $y = 3$. $(2, 3)$ and $(2, -5)$ share $x = 2$.
4. The missing corner takes the leftover pairing: $x = -3$ with $y = -5 \rightarrow (-3, -5)$, in Quadrant III.

Watch for: Answered $(-5, -3)$ by reversing the pair, or $(3, -5)$ by dropping a negative sign.

Lesson slides

teaching notes & timing

Slide	Time	What to do
1	0:00	Frame it: the plane is a map, and every point has an address.
2	1:00	Hook — poll same or different. Do NOT resolve. Reversal is the single most common plotting error.
3	2:30	Establish across-then-up. Give students a physical gesture for it; it sticks better than the words.
4	4:30	WE1 — resolve the hook. Plot BOTH points so the difference is visible, not just asserted.
5	6:30	WE2 — the quadrants and the axis exception. The axis case is skipped in most lessons and shows up on every assessment.
6	11:00	Connect the order rule to the shared-coordinate rule. The shared-coordinate idea is what the “Side lengths from coordinates” lesson uses to measure sides.
7		Show the problem and the slip. Pairs: what went wrong, and what is the right answer? Take two answers before moving on.
8		Solve it together, one step at a time. It is also the worked example at the top of the practice sheet, so students can look back at it.
9	9:00	CFU — all-student response. Answer Quadrant II. Watch for Quadrant I from ignoring the negative. Whiteboards: everyone tries Mild, then climbs. These are #1, #3, #6 on the practice sheet.
10		Fingers up: 3 = got it, 2 = almost, 1 = not yet. Pull the 1s for a quick reteach while everyone else starts the practice sheet.
11	13:00	Launch the in-class practice sheet. Launch the practice sheet. Exit ticket in the last 5–8 minutes.