

GRADE 6 · THE NUMBER SYSTEM · ANSWER KEY

DISTANCE ON THE COORDINATE PLANE

Today's goal: I can use coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.



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 mini-lesson/deck. Items 3 and 5 (same side of zero → subtract) sit against items 4 and 8 (opposite sides → the parts add). That contrast is the skill. **Timing:** 15–25 min · pairs or independent · circulate on 7–9. Items 1–3 fluency, 4–6 application, 7–9 reasoning. Item 8 deliberately rewards then limits the 'just add' shortcut.

1 5 units

2 6 units

3 7 units

4 8 units

5 5 units

6 7 units both ways

7 Width 8, height 6, perimeter 28 units

8 15 blocks

1 **MILD** (1,4) to (1,9)?

5 units

1. Same x → vertical. $|9 - 4| = 5$.

Watch for: Subtracted the x-values and answered 0.

2 **MILD** (5,2) to (11,2)?

6 units

1. Same y → horizontal. $|11 - 5| = 6$.

Watch for: Added the x-values.

3 **MEDIUM** (-8,0) to (-1,0)?

7 units

1. $|-1 - (-8)| = |-1 + 8| = 7$.

Watch for: Answered 9 by adding 8 and 1. Both are left of zero, so the gap between them is a difference.

4 **MEDIUM** (6,-5) to (6,3)?

8 units

1. Same x → vertical. $|3 - (-5)| = |3 + 5| = 8$.

Watch for: Answered 2 — did $5 - 3$ and ignored that the points straddle zero.

5 **MEDIUM** (-2,-9) to (-2,-4)?

5 units

1. Same x → vertical. $|-4 - (-9)| = |-4 + 9| = 5$.

Watch for: Answered 13 by adding 9 and 4 — both points are below zero, so subtract.

6 **SPICY** (2,5) to (9,5), then reversed?

7 units both ways

1. $|9 - 2| = 7$.

2. $|2 - 9| = |-7| = 7$.

3. Absolute value removes the direction, so the order of subtraction cannot change a distance.

Watch for: Reported -7 for the reversed order. Distance has no direction.

7 **SPICY** Rectangle $(-3, -2)$, $(5, -2)$, $(5, 4)$, $(-3, 4)$?

Width 8, height 6, perimeter 28 units

1. Bottom side: $|5 - (-3)| = 8$ units.
2. Right side: $|4 - (-2)| = 6$ units.
3. Opposite sides are equal, so perimeter $= 2(8) + 2(6) = 16 + 12 = 28$ units.

Watch for: Mixed up which coordinate to subtract for each side, or added all four corner values.

8 **EXTRA SPICY** Museum $(-6, 3)$ to stadium $(9, 3)$?

15 blocks

1. Same $y \rightarrow$ horizontal. $|9 - (-6)| = |9 + 6| = 15$ blocks.
2. Here adding 6 and 9 DOES work — but only because the points sit on OPPOSITE sides of zero, so you cross the origin.
3. If both were negative, like -6 and -9 , the distance would be 3, not 15.

Watch for: Learned 'just add the numbers' as a rule. It only holds when the points straddle zero; subtract-and-take-absolute-value always works.

Homework

7 problems + Mr DJ's worked example

Use: Parallels the practice sheet one-to-one. Item 7 applies the skill to a shape, which is the bridge into the Geometry domain. **Timing:** ~15 min at home · independent · review items 3 and 4 side by side (same side vs straddling zero) as the next-day warm-up.

1 6 units

2 7 units

3 6 units

4 12 units

5 6 units

6 10 units both ways

7 Width 8, height 6, perimeter 28 units

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

6 units

1. Same $x \rightarrow$ vertical. $|7 - 1| = 6$.

Watch for: Subtracted the x -values and answered 0.

2 **MILD** $(3, 4)$ to $(10, 4)$?

7 units

1. Same $y \rightarrow$ horizontal. $|10 - 3| = 7$.

Watch for: Added the coordinates.

3 **MEDIUM** $(-9, 3)$ to $(-3, 3)$?

6 units

1. $|-3 - (-9)| = |-3 + 9| = 6$.

Watch for: Answered 12 by adding 9 and 3. Same side of zero $\rightarrow$ subtract.

4 **MEDIUM** $(4, -7)$ to $(4, 5)$?

12 units

1. Same $x \rightarrow$ vertical. $|5 - (-7)| = |5 + 7| = 12$.

Watch for: Answered 2 — did $7 - 5$, ignoring that the points straddle zero.

5 MEDIUM $(-1,-8)$ to $(-1,-2)$?

6 units

1. Same x $\rightarrow$ vertical. $|-2 - (-8)| = |-2 + 8| = 6$.

Watch for: Answered 10 by adding 8 and 2 — both below zero, so subtract.

6 SPICY $(-4,6)$ to $(6,6)$, then reversed?

10 units both ways

1. $|6 - (-4)| = 10$.

2. $|-4 - 6| = |-10| = 10$.

3. Absolute value removes direction, so subtraction order cannot change the distance.

Watch for: Reported -10 for the reversed order.

7 SPICY Rectangle $(-2,-5)$, $(6,-5)$, $(6,1)$, $(-2,1)$?

Width 8, height 6, perimeter 28 units

1. Bottom: $|6 - (-2)| = 8$ units.

2. Right: $|1 - (-5)| = 6$ units.

3. Perimeter = $2(8) + 2(6) = 28$ units.

Watch for: Subtracted the wrong coordinate for one side, or summed all eight coordinate values.

Exit Ticket

4 problems

Use: End of the coordinate-distance lesson. 5–8 min, independent. Closes the G6 Number System domain. **Timing:** 5–8 min · independent. Items 2 and 3 are the matched pair: opposite sides of zero (add the parts) vs same side (subtract). Item 4 tests why order does not matter.

1 5 units

2 10 units

3 5 units

4 8 units — absolute value discards direction

1 MILD Distance $(2,3)$ to $(2,8)$?

5 units

1. The x-coordinates match (both 2), so this is a vertical line.

2. Distance = $|8 - 3| = 5$ units.

Watch for: Subtracted the x-coordinates ($2 - 2 = 0$) instead of the coordinates that differ.

2 MEDIUM Distance $(-4,1)$ to $(6,1)$?

10 units

1. The y-coordinates match, so this is a horizontal line.

2. Distance = $|6 - (-4)| = |6 + 4| = 10$ units.

Watch for: Answered 2 — computed $6 - 4$ and forgot that subtracting a negative adds. Count on a line: from -4 to 0 is 4, then 0 to 6 is 6, total 10.

3 MEDIUM Distance $(-7,5)$ to $(-2,5)$?

5 units

1. Same y, so horizontal.

2. Distance = $|-2 - (-7)| = |-2 + 7| = 5$ units.

Watch for: Answered 9 by adding 7 and 2. Both points are on the SAME side of zero, so you subtract the distances, not add them.

4 SPICY Distance $(3,-6)$ to $(3,2)$, and why never negative?

8 units — absolute value discards direction

1. Same x, so vertical. Distance = $|2 - (-6)| = |8| = 8$ units.

2. Reversing the order gives $|-6 - 2| = |-8| = 8$ — the same.

3. Distance measures HOW FAR, not which way, so the bars make the order irrelevant.

Watch for: Reported -8 by subtracting in one order and skipping the absolute value. A length cannot be negative.

Lesson slides

teaching notes & timing

Slide	Time	What to do
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1	0:00	Frame the skill: distance between points sharing a coordinate, using absolute value.
2	1:00	Hook — poll 2 vs 10. The '2' answer comes from $6 - 4$, forgetting the negative.
3	3:00	The method: identify which coordinate matches, subtract the other, take the absolute value.
4	5:00	WE1 — resolve the hook. Count along the line as a check; counting beats the rule when students are unsure.
5	7:00	WE2 — the contrast case. Same side of zero, so the answer is a difference, not a sum. This is the most common error in the whole skill.
6	11:00	Order-independence. A student who reports a negative distance has skipped the bars.
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 8 units. Watch for 4 or -8 . 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. This closes the Number System domain. Launch the practice sheet. Exit ticket in the last 5–8 minutes.