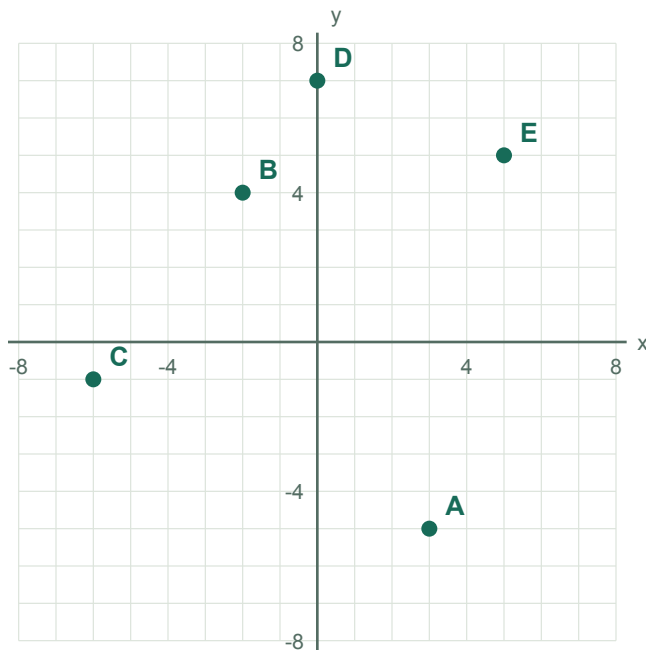


Rectangular coordinates

Complete practice answer guide • Plotting and interpreting points

Group A / Problems 1–7



Move horizontally first, then vertically.
Points on axes are not in any quadrant.

1. A (3, -5)

Quadrant IV: (+, -)

2. B (-2, 4)

Quadrant II: (-, +)

3. C (-6, -1)

Quadrant III: (-, -)

4. D (0, 7)

On the positive y-axis

5. E (5, 5)

Quadrant I: (+, +)

6. (-8, 3)

Quadrant II: (-, +)

7. Interpret the model exactly as printed

The worksheet prints $h(t) = 10 + 12t + 4.9t^2$. For elapsed time, $t \geq 0$. Every term is nonnegative and the constant term is 10, so $h(t)$ is always positive in this domain.

Answer: Quadrant I for $t > 0$. At $t = 0$, the point (0, 10) lies on the positive vertical axis.

Correction to the classroom annotation: Quadrant IV does not occur for this printed formula and $t \geq 0$. A falling-object model with a negative t^2 term would be a different equation.

Rectangular coordinates

Complete practice answer guide • Distance and midpoint

Group B / Distance

8. (1, 2) to (4, 6)

$$\begin{aligned} d &= \sqrt{[(4 - 1)^2 + (6 - 2)^2]} \\ &= \sqrt{(9 + 16)} = 5 \end{aligned}$$

The horizontal and vertical changes are 3 and 4.

9. (-3, 1) to (2, -1)

$$\begin{aligned} d &= \sqrt{[(2 + 3)^2 + (-1 - 1)^2]} \\ &= \sqrt{29} \approx 5.39 \end{aligned}$$

$\sqrt{29}$ has no perfect-square factor greater than 1.

10. (0, 0) to (-5, 12)

$$\begin{aligned} d &= \sqrt{[(-5)^2 + 12^2]} \\ &= \sqrt{169} = 13 \end{aligned}$$

Square each signed difference before adding.

11. (-2, -3) to (4, 5)

$$\begin{aligned} d &= \sqrt{[(4 + 2)^2 + (5 + 3)^2]} \\ &= \sqrt{100} = 10 \end{aligned}$$

The changes are 6 and 8. Distance is nonnegative.

Group C / Midpoint

12. (2, 3) and (8, 7)

$$\begin{aligned} M &= ((2 + 8)/2, (3 + 7)/2) \\ &= (5, 5) \end{aligned}$$

Average the x-values and y-values separately.

13. (-4, 6) and (2, -2)

$$\begin{aligned} M &= ((-4 + 2)/2, (6 - 2)/2) \\ &= (-1, 2) \end{aligned}$$

Include signs when adding coordinates.

14. (5, -9) and (-1, 3)

$$\begin{aligned} M &= ((5 - 1)/2, (-9 + 3)/2) \\ &= (2, -3) \end{aligned}$$

A midpoint is a location, so use an ordered pair.

15. (-7, -2) and (7, 10)

$$\begin{aligned} M &= ((-7 + 7)/2, (-2 + 10)/2) \\ &= (0, 4) \end{aligned}$$

This midpoint lies on the y-axis.

Rectangular coordinates

Complete practice answer guide • Mixed applications

16. Verify a right triangle

A(1, 1), B(4, 1), C(4, 5)

$$AB = |4 - 1| = 3$$

$$BC = |5 - 1| = 4$$

$$AC = \sqrt{(4 - 1)^2 + (5 - 1)^2} = \sqrt{25} = 5$$

Since $3^2 + 4^2 = 9 + 16 = 25 = 5^2$, the converse of the Pythagorean Theorem confirms a right triangle. The right angle is at B.

17. Estimate sales at the middle year

Use the ordered pairs (2019, 8.2) and (2023, 11.6), with sales measured in millions of dollars.

$$M = ((2019 + 2023)/2, (8.2 + 11.6)/2)$$

$$M = (2021, 9.9)$$

The estimated 2021 sales are \$9.9 million, assuming a linear trend between the given years.

18. Convert a map distance to meters

For (2, 3) and (14, 8):

$$d = \sqrt{(14 - 2)^2 + (8 - 3)^2}$$

$$d = \sqrt{144 + 25} = \sqrt{169} = 13 \text{ map units}$$

$$13 \text{ map units} \times 100 \text{ meters per unit} = 1,300 \text{ meters}$$

This is the straight-line distance. The scale conversion comes after the coordinate calculation.