

Topic: Slope and midpoint of a line segment

Question: Which pair of endpoints are the endpoints of a line segment that has a slope of $m = 3/5$?

Answer choices:

- A (1,2) and (7,5)
- B (−9,0) and (−4,3)
- C (−4, − 1) and (− 10, − 5)
- D (8,0) and (2, − 2)



Solution: B

Calculate the slope for each pair of points.

For answer choice A:

$$\frac{5 - 2}{7 - 1} = \frac{3}{6} = \frac{1}{2}$$

For answer choice B:

$$\frac{3 - 0}{-4 - (-9)} = \frac{3}{5}$$

For answer choice C:

$$\frac{-5 - (-1)}{-10 - (-4)} = \frac{-4}{-6} = \frac{2}{3}$$

For answer choice D:

$$\frac{-2 - 0}{2 - 8} = \frac{-2}{-6} = \frac{1}{3}$$

Only answer choice B gives the desired slope.



Topic: Slope and midpoint of a line segment

Question: Each pair of points in the table are the endpoints of some line segment. Which two segments have the same midpoint?

Segment	Point 1	Point 2
Segment AB	(1,-3)	(9,5)
Segment CD	(2,4)	(6,-3)
Segment EF	(3,0)	(6,6)
Segment GH	(1,1)	(9,1)

Answer choices:

- A \overline{AB} and \overline{GH}
- B \overline{CD} and \overline{EF}
- C \overline{EF} and \overline{GH}
- D \overline{AB} and \overline{CD}



Solution: A

Calculate the midpoint of each segment.

The midpoint of \overline{AB} :

$$(x, y) = \left(\frac{1 + 9}{2}, \frac{-3 + 5}{2} \right) = (5, 1)$$

The midpoint of \overline{CD} :

$$(x, y) = \left(\frac{2 + 6}{2}, \frac{4 + (-3)}{2} \right) = \left(4, \frac{1}{2} \right)$$

The midpoint of \overline{EF} :

$$(x, y) = \left(\frac{3 + 6}{2}, \frac{0 + 6}{2} \right) = \left(\frac{9}{2}, 3 \right)$$

The midpoint of \overline{GH} :

$$(x, y) = \left(\frac{1 + 9}{2}, \frac{1 + 1}{2} \right) = (5, 1)$$

The two segments with the same midpoint are \overline{AB} and \overline{GH} .



Topic: Slope and midpoint of a line segment

Question: A line segment has one endpoint at $(5,8)$, and its midpoint at $(3,2)$. Find the position of the other endpoint.

Answer choices:

- A $(7,14)$
- B $(9,0)$
- C $(0, -6)$
- D $(1, -4)$



Solution: D

Use the midpoint formula.

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

We know one endpoint is (5,8), so let $x_1 = 5$ and $y_1 = 8$.

The midpoint is (3,2), so

$$\left(\frac{5 + x_2}{2}, \frac{8 + y_2}{2} \right) = (3, 2)$$

From this equation, we get equations that we can solve for x_2 and y_2 .

$$\frac{5 + x_2}{2} = 3$$

$$5 + x_2 = 6$$

$$x_2 = 1$$

and

$$\frac{8 + y_2}{2} = 2$$

$$8 + y_2 = 4$$

$$y_2 = -4$$

Putting these together, we can say that the other endpoint is at (1, -4).

