

Practice

Equations of Lines: Slope, Distance, and Midpoint Formulas

Answer these problems. Then check your answers online. If you have the wrong answer, mark it incorrect, but then retry the problem. Write a sentence explaining your mistake and how you will avoid making it again.

1. The equation used to find the slope, m , of a line, given the points (x_1, y_1) and (x_2, y_2) is

$$\frac{y_2 - y_1}{x_2 - x_1}$$

2. Find the slope of the line passing through the points $(4, 3)$ and $(5, -2)$.

$$\frac{-2 - 3}{5 - 4} = \frac{-5}{1} = -5$$

3. Find the slope of the line passing through the points $(10, -1)$ and $(10, 1)$.

$$\frac{1 - (-1)}{10 - 10} = \frac{2}{0} \rightarrow \text{undefined}$$

4. Find the slope of the line passing through the points $(1, 11)$ and $(5, 11)$.

$$\frac{11 - 11}{5 - 1} = \frac{0}{4} = 0$$

5. Find the slope of the line passing through the points $(4, 9)$ and $(11, 5)$.

$$\frac{5 - 9}{11 - 4} = \frac{-4}{7}$$

6. Find the slope of the line passing through the points $(0, 0)$ and (a, b) .

$$\frac{b - 0}{a - 0} = \frac{b}{a}$$

7. Find the slope of the line passing through the points (c, d) and (g, h) .

$$\frac{h - d}{g - c}$$

→ distance measurement (not a pt.)

8. The equation used to find the distance, d , between the two points, (x_1, y_1) and (x_2, y_2) is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

LEAVE ALL ANSWERS AS EXACT VALUES.

9. Find the distance between points $(4, 3)$ and $(5, -2)$.

$$d = \sqrt{(5-4)^2 + (-2-3)^2}$$

$$d = \sqrt{1^2 + -5^2}$$

$$d = \sqrt{1+25}$$

$$d = \sqrt{26} \text{ units}$$

10. Find the distance between points $(10, -1)$ and $(10, 1)$.

$$d = \sqrt{(10-10)^2 + (-1-1)^2}$$

$$d = \sqrt{0^2 + 2^2}$$

$$d = \sqrt{4}$$

$$d = 2 \text{ units}$$

11. Find the distance between points $(1, 11)$ and $(5, 11)$.

$$d = \sqrt{(5-1)^2 + (11-11)^2}$$

$$d = \sqrt{(4)^2 + 0^2}$$

$$d = \sqrt{16}$$

$$d = 4 \text{ units}$$

12. Find the distance between points $(4, 9)$ and $(11, 5)$.

$$d = \sqrt{(11-4)^2 + (5-9)^2}$$

$$d = \sqrt{7^2 + -4^2}$$

$$d = \sqrt{49+16}$$

$$d = \sqrt{65} \text{ units}$$

13. Find the distance between points $(0, 0)$ and (a, b) .

$$d = \sqrt{(a-0)^2 + (b-0)^2}$$

$$d = \sqrt{a^2 + b^2}$$

$$d = \sqrt{a^2 + b^2} \text{ units}$$

14. Find the distance between points (c, d) and (g, h) .

$$d = \sqrt{(g-c)^2 + (h-d)^2} \text{ units}$$

Point: (x, y)

15. The formula used to find the midpoint, M , between the two points, (x_1, y_1) and (x_2, y_2) is

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

16. Find the midpoint of the line segment with endpoints $(4, 3)$ and $(5, -2)$.

$$\begin{aligned} \text{midpt} &= \left(\frac{9}{2}, \frac{1}{2} \right) \\ &= (4.5, 0.5) \end{aligned}$$

17. Find the midpoint of the line segment with endpoints $(10, -1)$ and $(10, 1)$.

$$\begin{aligned} &\left(\frac{10+10}{2}, \frac{1+(-1)}{2} \right) \\ &= \left(\frac{20}{2}, \frac{0}{2} \right) = (10, 0) \end{aligned}$$

18. Find the midpoint of the line segment with endpoints $(1, 11)$ and $(5, 11)$.

$$\begin{aligned} &\left(\frac{5+1}{2}, \frac{11+11}{2} \right) \\ &= \left(\frac{6}{2}, \frac{22}{2} \right) = (3, 11) \end{aligned}$$

19. Find the midpoint of the line segment with endpoints $(4, 9)$ and $(11, 5)$.

$$\begin{aligned} &\left(\frac{4+11}{2}, \frac{9+5}{2} \right) \\ &= \left(\frac{15}{2}, \frac{14}{2} \right) = \left(\frac{15}{2}, 7 \right) \text{ or } (7.5, 7) \end{aligned}$$

20. Find the midpoint of the line segment with endpoints $(0, 0)$ and (a, b) .

$$\begin{aligned} &\left(\frac{0+a}{2}, \frac{0+b}{2} \right) \\ &= \left(\frac{a}{2}, \frac{b}{2} \right) \end{aligned}$$

21. Find the midpoint of the line segment with endpoints (c, d) and (g, h) .

$$\left(\frac{c+g}{2}, \frac{d+h}{2} \right)$$

Part 1: 2009

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$\left(\frac{1}{2}, \frac{1}{2}\right) \text{ is a solution}$$

$$(1, 0) \text{ is a solution}$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$(0, 0) = \left(\frac{1}{2}, \frac{1}{2}\right)$$

$$\left(\frac{1}{2}, \frac{1}{2}\right) = \frac{1}{2} + \frac{1}{2}$$

$$(1, 1) = \left(\frac{1}{2}, \frac{1}{2}\right)$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$(1, 2) \text{ is not a solution}$$

$$\frac{1}{2} + \frac{1}{2} = 1$$

$$\left(\frac{1}{2}, \frac{1}{2}\right) = 1$$

$$\left(\frac{1}{2}, \frac{1}{2}\right) = \frac{1}{2} + \frac{1}{2}$$