

Practice

Equations of Lines: Slope, Distance, and Midpoint Formulas

Answer these problems, then check your answers using the key on the next page. If you missed something, look at the solutions after the answer key, and if you still don't understand, watch the review video again.

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

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

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

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

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

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

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

#8) Find the distance between points $(4, 9)$ and $(11, 5)$

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

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

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

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

Answers:

#1) -5

#2) *undefined*

#3) 0

#4) $-\frac{4}{7}$

#5) $\sqrt{26}$

#6) 2

#7) 4

#8) $\sqrt{65}$

#9) $\left(\frac{9}{2}, \frac{1}{2}\right)$

#10) $(10, 0)$

#11) $(3, 11)$

#12) $\left(\frac{15}{2}, 7\right)$

Solutions:

#1) Find the slope of the line passing through the points $(4, 3)$ and $(5, -2)$
 x_1, y_1 x_2, y_2

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{-2 - 3}{5 - 4}$$

$$\text{slope} = \frac{-5}{1}$$

$$\text{slope} = \boxed{-5}$$

#2) Find the slope of the line passing through the points $(10, -1)$ and $(10, 1)$
 x_1, y_1 x_2, y_2

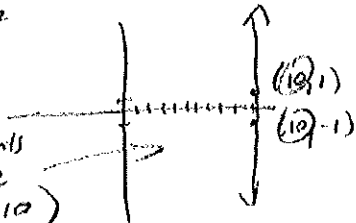
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{1 - (-1)}{10 - 10}$$

$$\text{slope} = \frac{1 + 1}{0}$$

$$\text{slope} = \frac{2}{0} \quad \boxed{\text{undefined}}$$

(these points
are on the
line $x = 10$)
vertical line



#3) Find the slope of the line passing through the points $(1, 11)$ and $(5, 11)$
 x_1, y_1 x_2, y_2

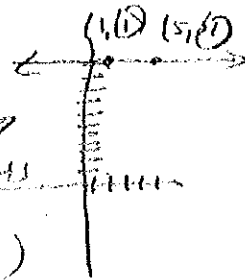
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{11 - 11}{5 - 1}$$

$$\text{slope} = \frac{0}{4}$$

$$\text{slope} = \boxed{0}$$

(these points
are on the
line $y = 11$)
horizontal line



#4) Find the slope of the line passing through the points $(4, 9)$ and $(11, 5)$
 x_1, y_1 x_2, y_2

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$\text{slope} = \frac{5 - 9}{11 - 4}$$

$$\text{slope} = \frac{-4}{7}$$

$$\text{slope} = \boxed{\frac{-4}{7}}$$

#5) Find the distance between points $(4, 3)$ and $(5, -2)$
 x_1, y_1 x_2, y_2

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

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

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

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

$$\boxed{d = \sqrt{26}}$$

#6) Find the distance between points $(10, -1)$ and $(10, 1)$
 x_1, y_1 x_2, y_2

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

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

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

$$d = \sqrt{4}$$

$$\boxed{d = 2}$$

#7) Find the distance between points $(1, 11)$ and $(5, 11)$
 x_1, y_1 x_2, y_2

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

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

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

$$d = \sqrt{16}$$

$$\boxed{d = 4}$$

#8) Find the distance between points $(4, 9)$ and $(11, 5)$
 x_1, y_1 x_2, y_2

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

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

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

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

$$\boxed{d = \sqrt{65}}$$

#9) Find the midpoint of the line segment with endpoints $(4, 3)$ and $(5, -2)$
 x_1, y_1 x_2, y_2

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

$$\text{midpoint} = \left(\frac{4 + 5}{2}, \frac{3 + (-2)}{2} \right)$$

$$\text{midpoint} = \left(\frac{9}{2}, \frac{1}{2} \right)$$

#10) Find the midpoint of the line segment with endpoints $(10, -1)$ and $(10, 1)$
 x_1, y_1 x_2, y_2

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

$$\text{midpoint} = \left(\frac{10 + 10}{2}, \frac{-1 + 1}{2} \right)$$

$$\text{midpoint} = \boxed{(10, 0)}$$

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

$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \quad \begin{matrix} x_1, y_1 & x_2, y_2 \end{matrix}$$

$$\text{midpoint} = \left(\frac{1+5}{2}, \frac{11+11}{2} \right)$$

$$\text{midpoint} = \boxed{(3, 11)}$$

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

$$\text{midpoint} = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) \quad \begin{matrix} x_1, y_1 & x_2, y_2 \end{matrix}$$

$$\text{midpoint} = \left(\frac{4+11}{2}, \frac{9+5}{2} \right)$$

$$\text{midpoint} = \boxed{\left(\frac{15}{2}, 7 \right)}$$