

## 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  $(10, 1)$   
 $x_1, y_1$        $x_2, y_2$

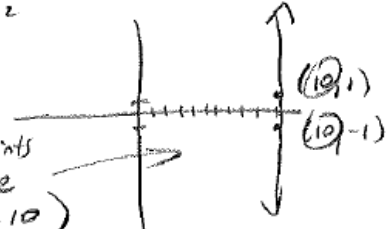
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

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

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

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

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



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

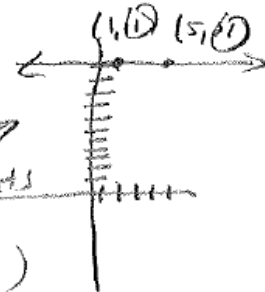
$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

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

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

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

(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  $(5, 11)$

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

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

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

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

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

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

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