Name _____

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

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

_____ .

2. Find the slope of the line passing through the points ($\overset{x_1 \ y_1}{4, 3}$) and ($\overset{x_2 \ y_2}{5, -2}$).

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

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

$$\frac{1--1}{10-10} = \frac{2}{0} \qquad \text{slope is undefined}$$

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

$$\frac{11-11}{5-1} = \frac{0}{4} \qquad \text{slope is } 0$$

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

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

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

$$\frac{b-0}{a-0} = \frac{b}{a} \qquad \text{slope} = \frac{b}{a}$$

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

$$\text{slope} = \frac{h-d}{g-c}$$

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

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

LEAVE ALL ANSWERS AS EXACT VALUES.

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

$$d = \sqrt{(-2-3)^2 + (5-4)^2}$$
$$\sqrt{(-5)^2 + (1)^2}$$
$$\sqrt{25 + 1}$$

$\rightarrow$ $\boxed{\sqrt{26} = 5.0}$

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

$$\sqrt{(1--1)^2 + (10-10)^2}$$
$$\sqrt{(2)^2 + (0)^2}$$
$$\sqrt{4 + 0}$$

$\rightarrow$ $\sqrt{4} = \boxed{2}$

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

$$\sqrt{(11-11)^2 + (5-1)^2}$$
$$\sqrt{0^2 + 4^2}$$
$$\sqrt{4^2}$$

$\rightarrow$ $\sqrt{16}$
$\boxed{4}$

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

$$\sqrt{(5-9)^2 + (11-4)^2}$$
$$\sqrt{(-4)^2 + (7)^2}$$
$$\sqrt{16 + 49}$$

$\rightarrow$ $\sqrt{65}$ $= 8.06$

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

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

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

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

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

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

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

$$Midpt. = \left(\frac{5+4}{2}, \frac{-2+3}{2} \right) \longrightarrow \left(\frac{9}{2}, \frac{1}{2} \right)$$

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

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

$$\left(\frac{20}{2}, \frac{0}{2} \right) \qquad \boxed{(10, 0)}$$

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

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

$$\left(\frac{6}{2}, \frac{22}{2} \right) \qquad \boxed{(3, 11)}$$

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

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

$$\left(\frac{15}{2}, \frac{14}{2} \right) \qquad \boxed{(7.5, 7)}$$

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

$$\left(\frac{a+0}{2}, \frac{b+0}{2} \right)$$

$$\boxed{\left(\frac{a}{2}, \frac{b}{2} \right)}$$

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

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