

# Unit Test 6 (First Attempt)

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

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

Write all equations in general form

1. What is the slope of a line that passes through the points (4,5) (-3,-9)?

$$\text{rise} : 5 - (-9) = 14$$

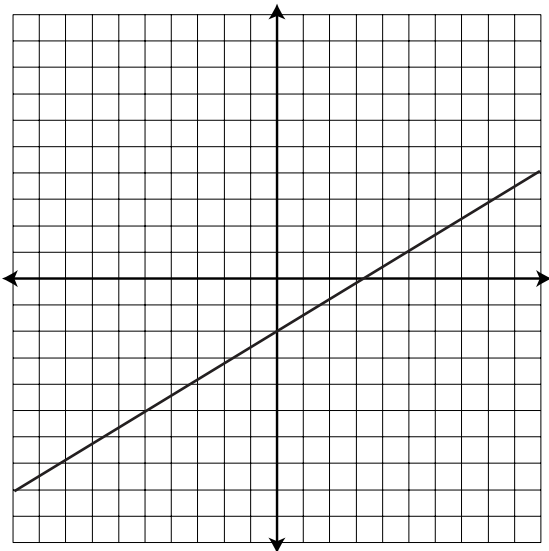
$$\text{run} : 4 - (-3) = 7$$

$$\text{slope} = \frac{14}{7} = 2$$

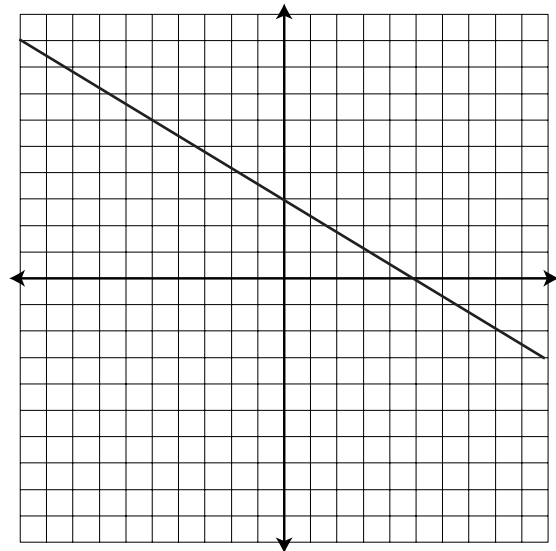
2. Explain why the slope of the line  $x = 5$  is undefined.

Because it is a vertical line, there is no horizontal distance between any of the points (no run) so when you divide rise by run you are dividing by zero.

3. Graph the line  $y = \frac{2}{3}x - 2$



- Graph the line  $3x + 5y - 15 = 0$



4. What is the x-intercept of the line  $5x + 8y - 10 = 0$ ? Show how you know.

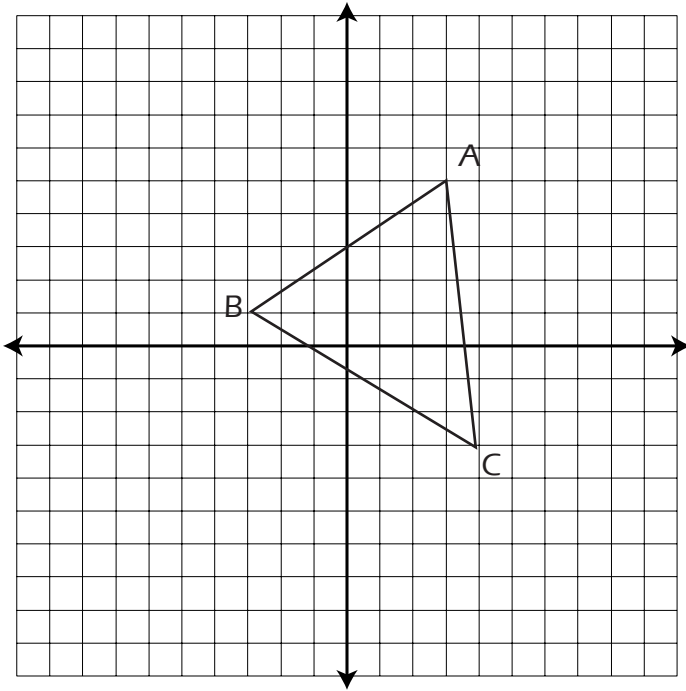
The x-intercept is (2,0) because at the x-intercept the y-value is always 0. Hence,

$$5x + 8(0) - 10 = 0$$

$$5x = 10$$

$$x = 2$$

5. An isosceles triangle is a triangle with two equal sides. Use the following grid to show that a triangle with corners at  $(3,5)$ ,  $(-3,1)$  and  $(4,-3)$  is an isosceles triangle.



Distance from B to C:

rise : 4 run : 7

$$d^2 = 4^2 + 7^2 = 65$$

$$d = \sqrt{65}$$

Distance from A to C:

rise : 8 run : 1

$$d^2 = 1^2 + 8^2 = 65$$

$$d = \sqrt{65}$$

BC and AC have equal length so it is an isosceles triangle.

6. Find the equation of a line that has a slope of  $\frac{3}{4}$  and an x-intercept of  $-3$ .

$$m = \frac{3}{4} \quad P(-3,0)$$

$$y - 0 = \frac{3}{4}(x - (-3))$$

$$4y = 3x + 9$$

$$0 = 3x - 4y + 9$$

7. Find the equation of a line that passes through the points  $(1,2)$  and  $(-3,-4)$

$$m = \frac{2 - (-4)}{1 - (-3)} = \frac{3}{2} \quad P(1,2)$$

$$y - 2 = \frac{3}{2}(x - 1)$$

$$2y - 4 = 3x - 3$$

$$0 = 3x - 2y + 1$$

8. Find the equation of a line perpendicular to the line  $3x - 5y + 1 = 0$  and passes through the point  $(3,7)$ .

Slope of original line:

Slope of perpendicular line:  $m_{\perp} = -\frac{5}{3}$

$$-5y = -3x - 1$$

$$y = \frac{3}{5}x + \frac{1}{5}$$

$$m = \frac{3}{5}$$

Equation of new line:

$$y - 7 = -\frac{5}{3}(x - 3)$$

$$3y - 21 = -5x + 15$$

$$5x + 3y - 36 = 0$$

9. Find the equation of a line parallel to the y-axis and passing through (4,9).

Parallel to the y-axis is vertical. All vertical lines have a single x-value that does not depend on the y-value, so in this case, the equation is:

$$x=4$$

10. Find the equation of a line with an x-intercept of 3 and a y-intercept of 11.

$$P_1(3,0)$$

$$P_2(0,11)$$

$$\text{rise} : 0 - 11 = -11$$

$$\text{run} : 3 - 0 = 3$$

$$\text{slope} = \frac{-11}{3}$$

$$y = -\frac{11}{3}x + 11$$

$$3y = -11x + 33$$

$$11x + 3y - 33 = 0$$

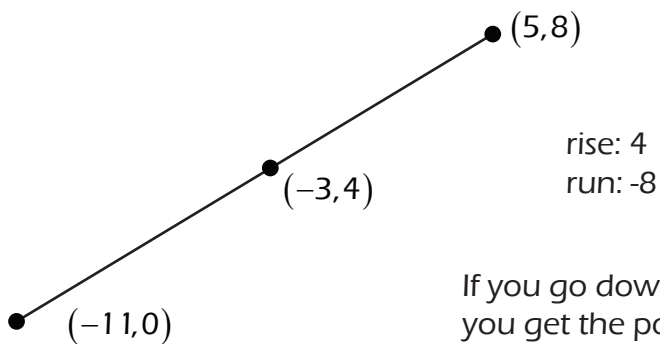
11. Find the midpoint between the points (61,23) and (75,3)

$$\text{Average } x: \frac{61+75}{2} = 68$$

$$\text{Midpoint: } (68,13)$$

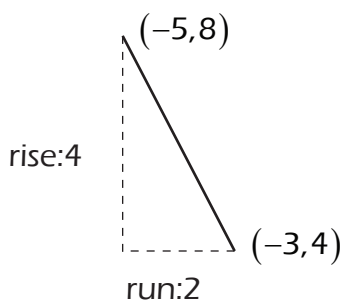
$$\text{Average } y: \frac{23+3}{2} = 13$$

12. One end of a line segment is at (5,8) and the midpoint is (-3,4). Where is the other endpoint?



If you go down another 4 and then left another 8 you get the point: (-11,0)

13. How far is it between the points (-3,4) and (-5,8)?



$$d^2 = 4^2 + 2^2 = 16 + 4$$

$$d = \sqrt{20} = 2\sqrt{5}$$