

Name: _____

Date: _____

FORMS OF A LINE
ALGEBRA 2 WITH TRIGONOMETRY

Linear functions come in many useful forms. You should already be familiar with the two that we discuss in this lesson.

TWO COMMON FORMS OF A LINE

Slope-Intercept: $y = mx + b$

Point-Slope: $y - y_1 = m(x - x_1)$

where m is the slope of the line and (x_1, y_1) represents one point on the line.

Exercise #1: Consider the linear function $f(x) = 3x + 5$.

(a) Determine the y -intercept of this function by evaluating $f(0)$.

(b) For the general linear function $g(x) = mx + b$ show that the y -intercept is always b .

Exercise #2: Consider a line whose slope is 5 and which passes through the point $(-2, 8)$.

(a) Write the equation of this line in point-slope form, $y - y_1 = m(x - x_1)$.

(b) Write the equation of this line in slope-intercept form, $y = mx + b$.

Exercise #3: Which of the following represents an equation for the line that is parallel to $y = \frac{3}{2}x - 7$ and which passes through the point $(6, -8)$?

(1) $y - 8 = -\frac{2}{3}(x + 6)$ (3) $y + 8 = \frac{3}{2}(x - 6)$

(2) $y - 8 = \frac{3}{2}(x + 6)$ (4) $y + 8 = -\frac{2}{3}(x - 6)$ _____

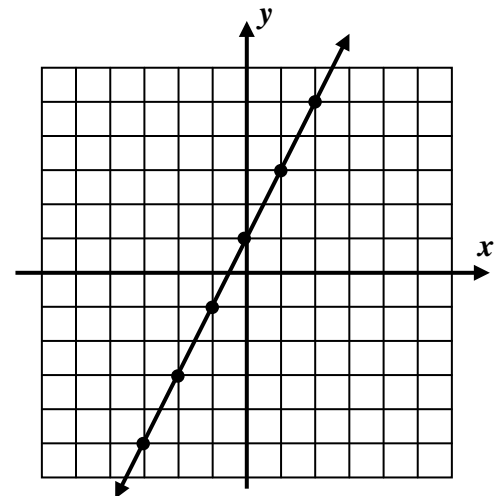


Exercise #4: A line passes through the points $(5, -2)$ and $(20, 4)$.

- (a) Determine the slope of this line in simplest rational form.
- (b) Write an equation of this line in point-slope form.
- (c) Write an equation for this line in slope-intercept form.
- (d) For what x -value will this line pass through a y -value of 12?

Exercise #5: The graph of a linear function is shown below.

- (a) Write the equation of this line in $y = mx + b$ form.
- (b) What must be the slope of a line perpendicular to the one shown?
- (c) Draw a line perpendicular to the one shown that passes through the point $(1, 3)$.
- (d) Write the equation of the line you just drew in point-slope form.



- (e) Does the line that you drew contain the point $(30, -15)$? Justify.



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FORMS OF A LINE
ALGEBRA 2 WITH TRIGONOMETRY - HOMEWORK

SKILLS

1. Which of the following lines is *perpendicular* to $y = \frac{5}{3}x - 7$ and has a y-intercept of 4?

(1) $y = \frac{5}{3}x + 4$

(3) $y = 4x - \frac{3}{5}$

(2) $y = -\frac{3}{5}x + 4$

(4) $y = \frac{3}{5}x + 4$

2. Which of the following lines passes through the point $(-4, -8)$?

(1) $y + 8 = 2(x + 4)$

(3) $y + 8 = 2(x - 4)$

(2) $y - 8 = 2(x - 4)$

(4) $y - 8 = 2(x + 4)$

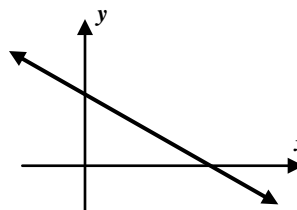
3. Which of the following equations could describe the graph of the linear function shown below?

(1) $y = \frac{2}{3}x - 4$

(3) $y = -\frac{2}{3}x - 4$

(2) $y = \frac{2}{3}x + 4$

(4) $y = -\frac{2}{3}x + 4$



4. For a line whose slope is -3 and which passes through the point $(5, -2)$:

(a) Write the equation of this line in point-slope form, $y - y_1 = m(x - x_1)$.

(b) Write the equation of this line in slope-intercept form, $y = mx + b$.

5. For a line whose slope is 0.8 and which passes through the point $(-3, 1)$:

(a) Write the equation of this line in point-slope form, $y - y_1 = m(x - x_1)$.

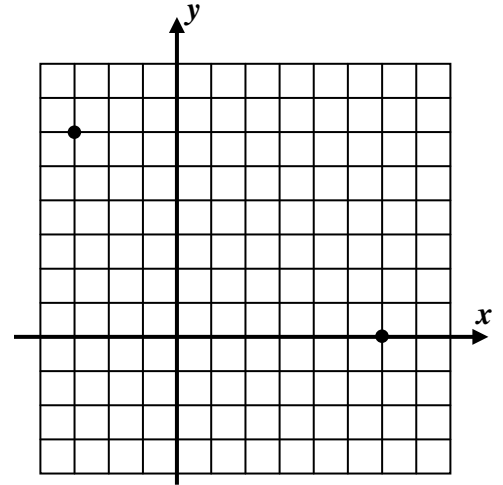
(b) Write the equation of this line in slope-intercept form, $y = mx + b$.



REASONING

6. The two points $(-3, 6)$ and $(6, 0)$ are plotted on the grid below.

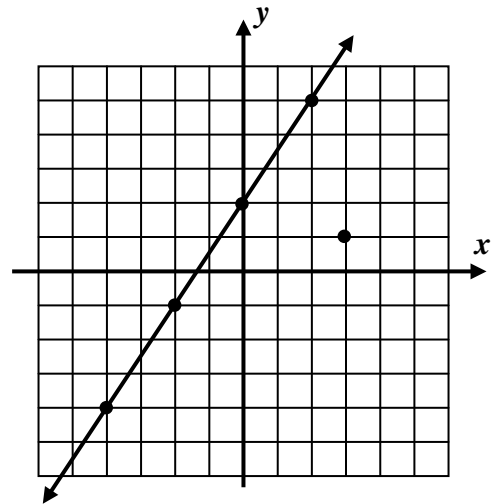
- (a) Find an equation, in $y = mx + b$ form, for the line passing through these two points. Use of the grid is optional.



- (b) Does the point $(30, -16)$ lie on this line? Justify.

7. A linear function is graphed below along with the point $(3, 1)$.

- (a) Draw a line parallel to the one shown that passes through the point $(3, 1)$.
- (b) Write an equation for the line you just drew in point-slope form.



- (c) Between what two consecutive integers does the y-intercept of the line you drew fall?

- (d) Determine the *exact* value of the y-intercept of the line you drew.

