

## HONORS ALGEBRA 2

## Prerequisite Skills Assessment

Each solution provided here (in blue) illustrates one of potentially several techniques for answering the given question. If you have attempted another method and still need clarification, please see your teacher for help

1. Solve  $3x - 7 = 8x + 12$ .

a.  $x = -19/5$

b.  $x = -1$

c.  $x = 1$

d.  $x = 19/5$

e. no solution

$$3x - 7 = 8x + 12$$

$$(3x - 7) - 3x = (8x + 12) - 3x$$

$$-7 = 5x + 12$$

$$(-7) - 12 = (5x + 12) - 12$$

$$-19 = 5x$$

$$\frac{-19}{5} = \frac{5x}{5}$$

$$x = -19/5$$

2. Solve  $-\frac{3}{5}(x + 2) = \frac{7}{3}$ .

a.  $x = -61/9$

b.  $x = -53/9$

c.  $x = -11/3$

d.  $x = -17/9$

e. no solution

$$-\frac{3}{5}(x + 2) = \frac{7}{3}$$

$$-\frac{3}{5}x - \frac{6}{5} = \frac{7}{3}$$

$$15 \cdot \left(-\frac{3}{5}x - \frac{6}{5}\right) = 15 \cdot \left(\frac{7}{3}\right)$$

$$-9x - 18 = 35$$

$$(-9x - 18) + 18 = (35) + 18$$

$$-9x = 53$$

$$\frac{-9x}{-9} = \frac{53}{-9}$$

$$x = -53/9$$

3. Solve  $3x - (5 + 7x) \leq 11$ .
- $x \leq 8/5$
  - $x \geq 8/5$
  - $x \leq -4$

$$3x - (5 + 7x) \leq 11$$

$$3x - 5 - 7x \leq 11$$

$$-4x - 5 \leq 11$$

$$(-4x - 5) + 5 \leq (11) + 5$$

$$-4x \leq 16$$

$$\frac{-4x}{-4} \geq \frac{16}{-4}$$

$$x \geq -4$$

- $x \geq -4$
- all real numbers

4. Solve for  $b_1$ :  $A = \frac{1}{2}h(b_1 + b_2)$ .

- $b_1 = \frac{h}{2}(A - b_2)$

- $b_1 = \frac{2}{h}(A - b_2)$

- $b_1 = \frac{2A}{h} - b_2$

- $b_1 = \frac{2h}{A} - b_2$

- none of these

$$A = \frac{1}{2}h(b_1 + b_2)$$

$$2 \cdot A = 2 \cdot \left[ \frac{1}{2}h(b_1 + b_2) \right]$$

$$2A = h(b_1 + b_2)$$

$$\frac{2A}{h} = \frac{h(b_1 + b_2)}{h}$$

$$\frac{2A}{h} = b_1 + b_2$$

$$\left( \frac{2A}{h} \right) - b_2 = (b_1 + b_2) - b_2$$

$$\frac{2A}{h} - b_2 = b_1$$



7. Which equation is equivalent to  $y = \frac{7}{5}x - 2$  ?

a.  $7x - 5y = -10$

d.  $7x + 5y = 2$

b.  $7x + 5y = 10$

e.  $7x - 5y = 2$

c.  **$7x - 5y = 10$**

$$y = \frac{7}{5}x - 2$$

$$5 \cdot y = 5 \cdot \left( \frac{7}{5}x - 2 \right)$$

$$5y = 7x - 10$$

$$(5y) - 7x = (7x - 10) - 7x$$

$$-7x + 5y = -10$$

$$-1 \cdot (-7x + 5y) = -1 \cdot (-10)$$

$$7x - 5y = 10$$

8. The graph of which equation would be perpendicular to  $3x + y = 7$  ?

a.  $y = -3x + 5$

d.  **$y = \frac{1}{3}x - 2$**

b.  $y = 3x - 5$

e. none of these

c.  $y = -\frac{1}{3}x + 2$

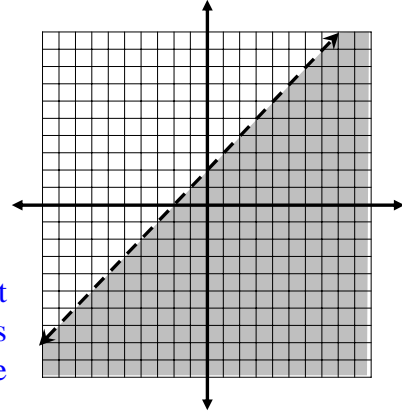
The slope in standard form ( $ax + by = c$ ) can be found as  $m = -a/b$ . Another option is to solve the given equation for  $y$  to get slope-intercept form ( $y = mx + b$ ). Using either technique shows that the slope of the given line is  $m = -3$ .

Since perpendicular lines have slopes that are negative reciprocals of each other, an equation with a slope of  $m = 1/3$  is needed.

9. Which inequality is graphed at the right?

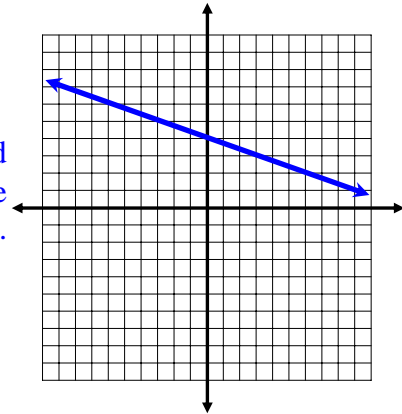
- a.  $y = x + 2$
- b.  $y \geq x + 2$
- c.  $y > x + 2$
- d.  $y \leq x + 2$
- e.  $y < x + 2$

Since the shading is below the line, the inequality must include the less than symbol (either  $<$  or  $\leq$ ). The line is dashed, so there is no equal sign and  $\leq$  has to be eliminated.



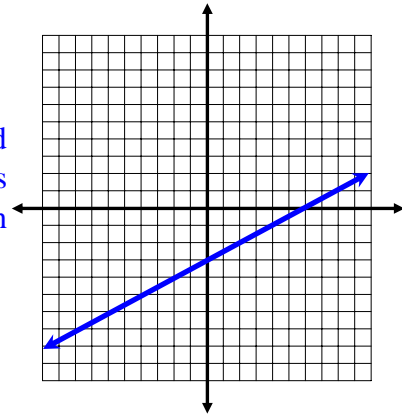
10. Graph the equation  $y = 4 - \frac{x}{3}$ .

The equation is in slope-intercept form where  $b = 4$  and  $m = -1/3$ . Plot the  $y$ -intercept at  $(0, 4)$ , then move down one unit and right three units to the point  $(3, 3)$ . Draw the line that passes through these points.



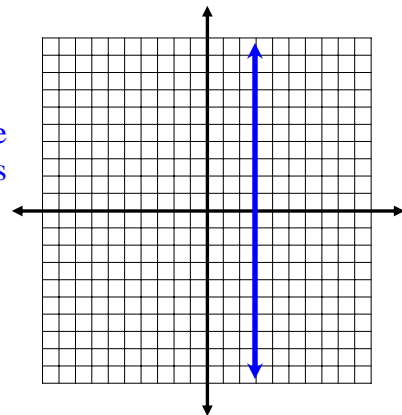
11. Graph the equation  $x - 2y = 6$ .

The equation is in standard form, so find the  $x$ - and  $y$ -intercepts. When  $x = 0$ ,  $y = -3$ , so the  $y$ -intercept is  $(0, -3)$ . Likewise,  $x = 6$  when  $y = 0$ , so there is an  $x$ -intercept at  $(6, 0)$ .



12. Graph a vertical line and state its equation.

Any vertical line would have the equation  $x = a$ , where  $(a, 0)$  is the  $x$ -intercept. In this example, the line's equation would be  $x = 3$ .



13. Write the slope-intercept (or y-intercept) form of the line that has a slope of 4 and passes through the coordinate (1, -3).

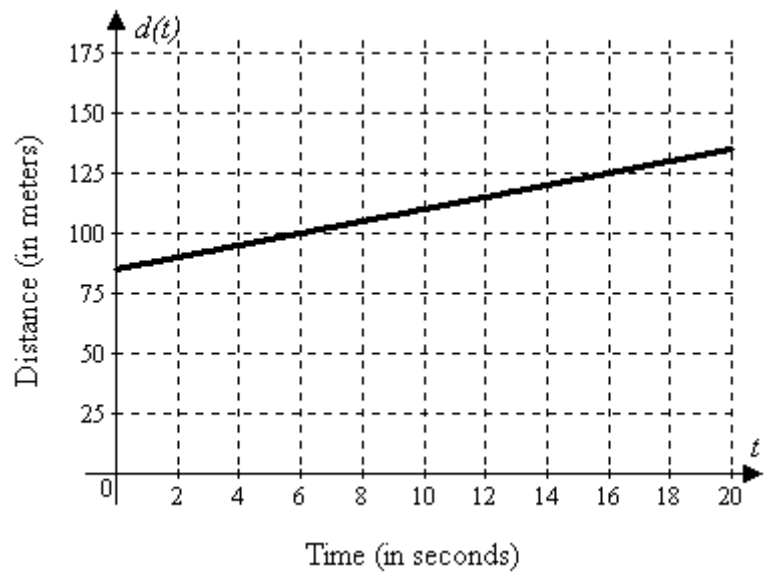
Start with the point-slope form,  $y - y_1 = m(x - x_1)$ , where  $(x_1, y_1)$  is the point (1, -3) and  $m = 4$ . Then solve for  $y$ .

$$\begin{aligned}y - y_1 &= m(x - x_1) \\y - (-3) &= 4(x - 1) \\y + 3 &= 4x - 4 \\(y + 3) - 3 &= (4x - 4) - 3 \\y &= 4x - 7\end{aligned}$$

14. State the slope of the line in the graph shown below.

Use the coordinates (6, 100) and (16, 125).

$$\begin{aligned}m &= \frac{\Delta y}{\Delta x} \\&= \frac{125 - 100}{16 - 6} \\&= \frac{25}{10} \\&= 2.5\end{aligned}$$



15. Using appropriate units, state the meaning of the slope in the graph above.

Since the range represents distance in meters and the domain represents the time in seconds, the slope is the rate of change in distance with respect to time. This ratio is also called the velocity or speed, and it would be 2.5 meters per second (m/s). Stated another way, for every second of time that passes, the subject would move 2.5 meters away.