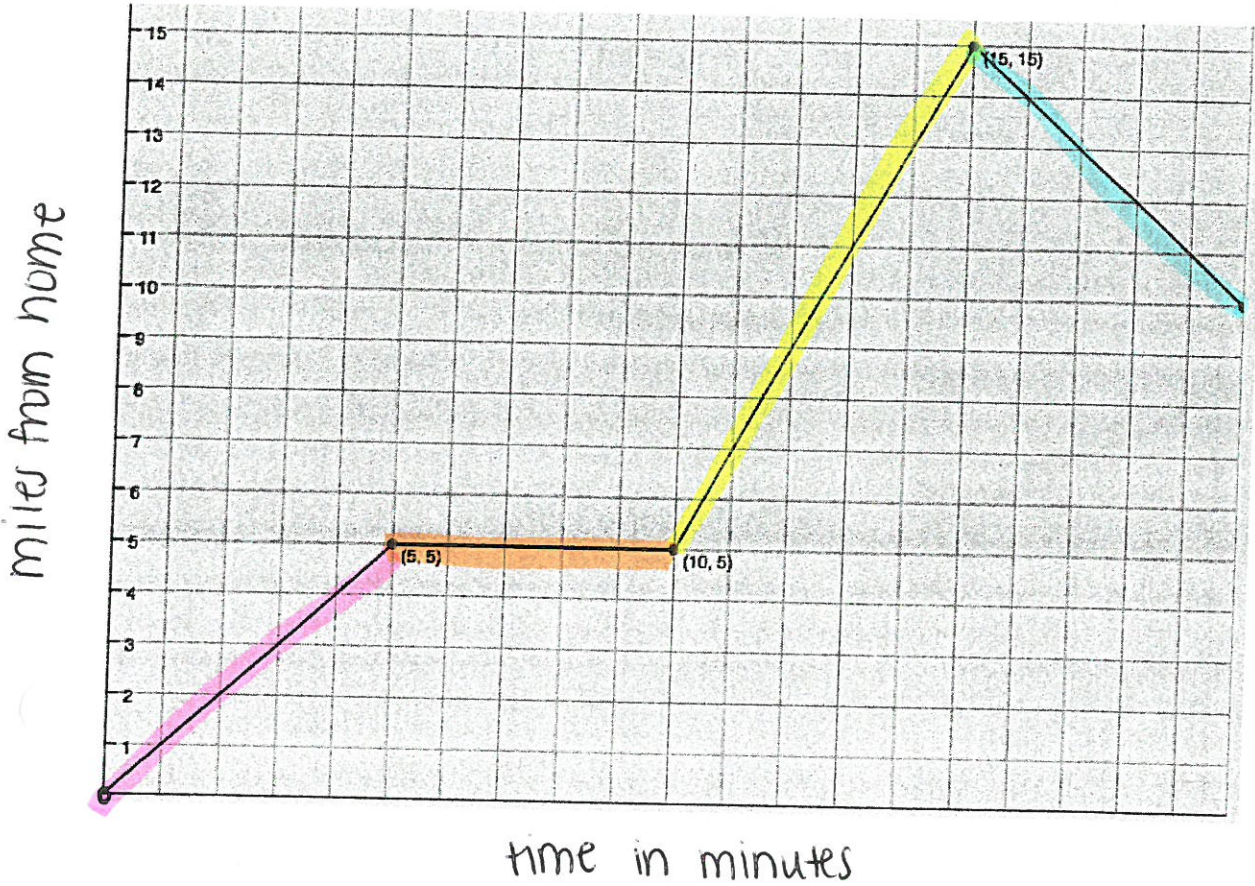


* piecewise function

1. Create a story that matches the graph below. Label axes and be as specific as possible in describing what is happening to connect your story to the graph.



I started at my house. then, i decided to drive to target. I spent some time at Target. After target, i got the freeway and drove to my brother's house. Immediately, i realized he's not home. i turn around and drive to my parents' house.

Δ = "change in"

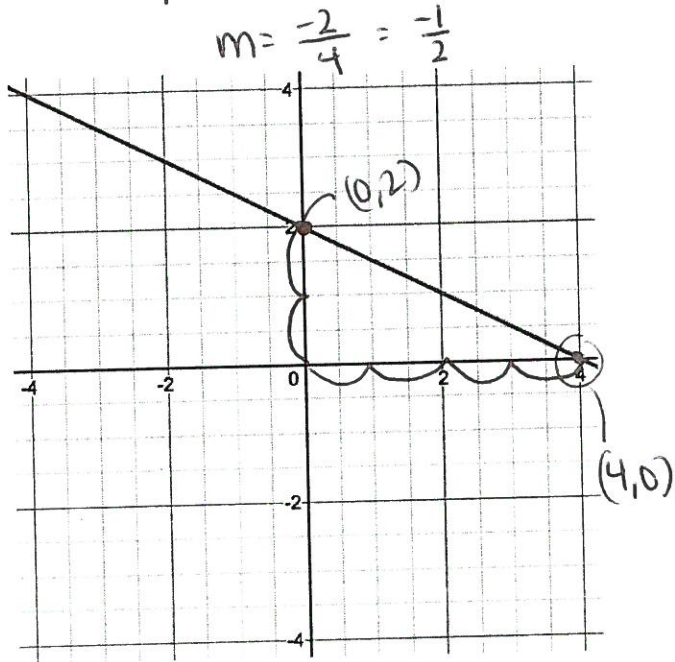
Linear Equations Review:

Slope-Intercept Form: $y = mx + b$

$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x}$, $b = \text{y-intercept} = \frac{x=0}{(0, -)}$

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

$m = \text{Slope}$, $(x_1, y_1) = \text{point}$



1) Write an equation for the graph in both slope-intercept: *

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

and point-slope form. X

$$y = -\frac{1}{2}(x - 4) + 0$$

2) Graph the function $y - 5 = \frac{2}{3}(x - 3)$.

slope = $\frac{2}{3}$

point = $(3, 5)$

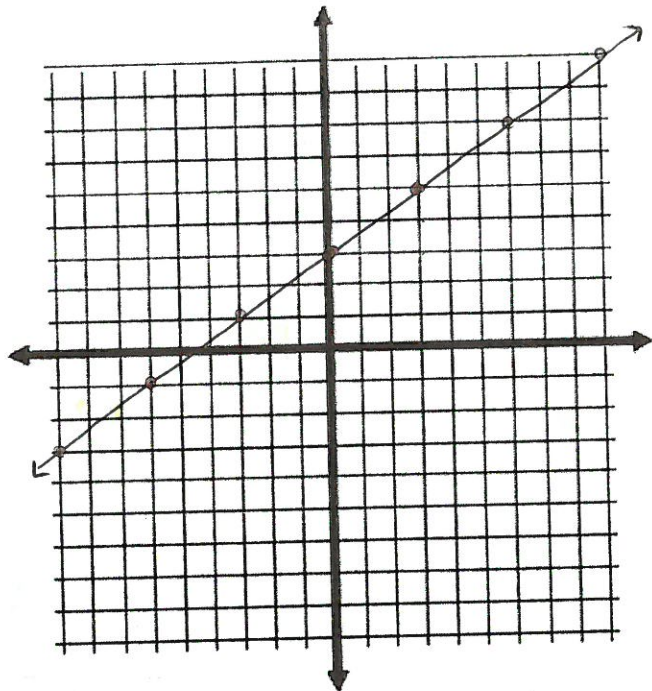
Simplify to change into slope-intercept form.

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

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

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

$$y = \frac{2}{3}x + 3$$



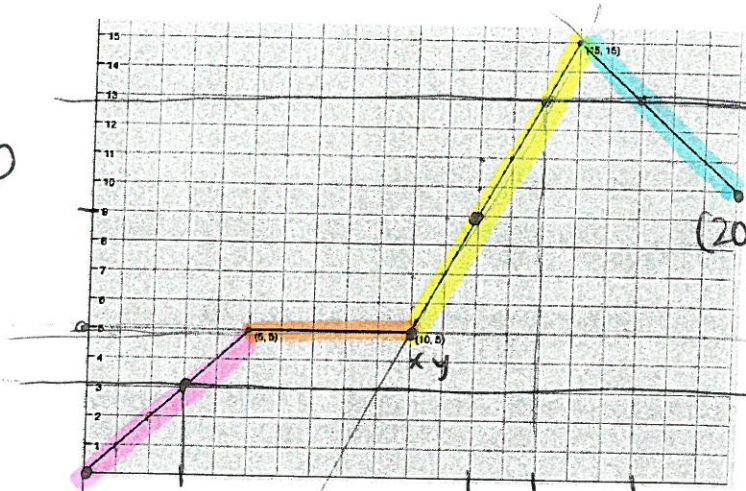
yellow line:

$$y = 2x + b$$

$$5 = 2 \cdot 10 + b$$

$$5 = 20 + b$$

$$\frac{-20 \quad -20}{-15 = b}$$



blue line:

$$y = -1x + b$$

$$10 = -1 \cdot 20 + b$$

$$10 = -20 + b$$

$$\frac{+20 \quad +20}{30 = b}$$

1. Identify and write the function and domain for each section of the graph (use set notation).

function here , domain here

$$f(x) = \begin{cases} 1x + 0 & , & 0 \leq x \leq 5 \\ 0x + 5 & , & 5 < x \leq 10 \\ 2x - 15 & , & 10 < x \leq 15 \\ -1x + 30 & , & 15 < x \leq 20 \end{cases}$$

The function you created above is called a **piecewise function**. In mathematics, a piecewise-defined function is a function defined by more than one sub-function (or a piece of a function), with each section only existing in a certain interval of the function's domain.

Find the following.

2. $f(12) = 2(12) - 15 = 24 - 15 = 9$

Use the story you created for the graph to explain the meaning of this point.

12 minutes after I left my house, I was 9 miles

Which function above could you use to find the value of $f(12)$? away from my house.
the yellow function

3. $f(7) = 0(7) + 5 = 0 + 5 = 5$

4. $f(x) = 3$ $x = 3$

5. $f(x) = 13$ $x = 14$ $x = 17$

6. $f(15) = 2(15) - 15 = 30 - 15 = 15$

graph

Slope-Intercept Form: $y = mx + b$

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

Write an equation for each in point-slope form.

7. A line with slope = -2 and goes through (1, -3).
m x_1 y_1

$$y = -2(x - 1) - 3$$

8. A line that goes through the points (2, -2) and (8, 1). Hint: Find the slope first.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-2 - 1}{8 - 2} = \frac{-3}{6} = -\frac{1}{2}$$

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

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

Solve: You will have 2 answers.

9. $|x| = 6$

$$x = 6$$

$$x = -6$$

*absolute value bars:

distance from zero,
always positive

10. $|x + 4| = 7$

$$\begin{array}{r} x + 4 = 7 \\ -4 \quad -4 \\ \hline \end{array}$$

$$x = 3$$

$$\begin{array}{r} x + 4 = -7 \\ -4 \quad -4 \\ \hline \end{array}$$

$$x = -11$$

*to solve:

split into
2 equations
+/-

check: $|3 + 4| = 7$
 $|7| = 7$

$|-11 + 4| = 7$
 $|-7| = 7$

11. $|x - 3| = 12$

$$\begin{array}{r} x - 3 = 12 \\ +3 \quad +3 \\ \hline \end{array}$$

$$x = 15$$

$$\begin{array}{r} x - 3 = -12 \\ +3 \quad +3 \\ \hline \end{array}$$

$$x = -9$$

check: $|15 - 3| = 12$
 $|12| = 12 \checkmark$

$|-9 - 3| = 12$
 $|-12| = 12 \checkmark$