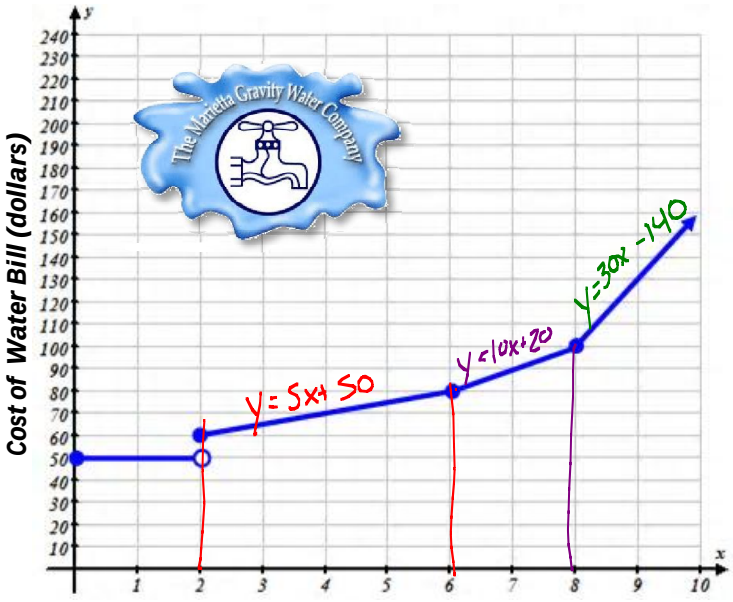
1. A city water company charges homeowners based on how much water they use in thousands of gallons. The company progressively charges at a higher rate the more water that is used.



   a. Based on the graph at the right how much does the city charged when a home owner uses the following number of gallons of water:

   1700 gallons of water costs $50.

   2000 gallons of water costs $60.

   7000 gallons of water costs $90.

   b. Finish filling in the following piece-wise equation below that describes the chart based on the graph:

$$y = \begin{cases} 50 & \text{if } 0 \le x < 2 \\ 5x + 50 & \text{if } 2 \le x < 6 \\ 10x + 20 & \text{if } 6 \le x < 8 \\ 30x - 140 & \text{if } x \ge 8 \end{cases}$$

$y = mx + b$

SLOPE $= \frac{\text{RISE}}{\text{RUN}} = \frac{20}{10}$ Y-INTERCEPT

$y = \frac{20}{2}x + 20$

$y = 10x + 20$

2. Graph the following piece-wise graph

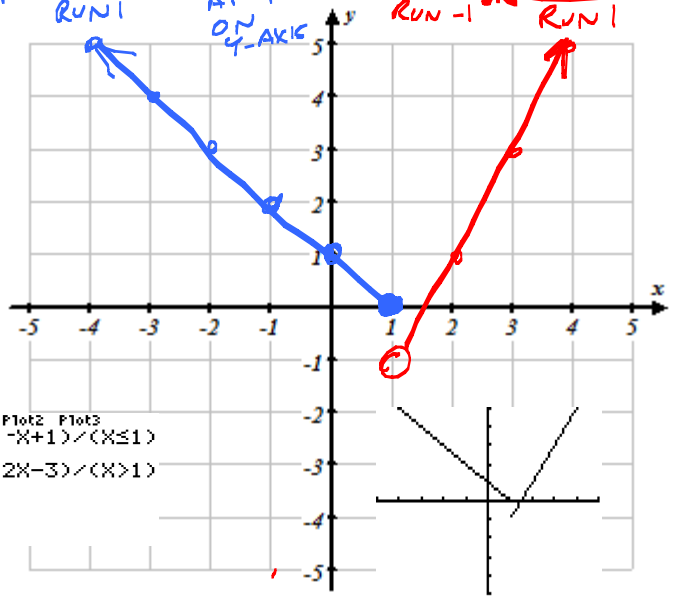
$$y = \begin{cases} -x + 1, & x \le 1 \\ 2x - 3. & x > 1 \end{cases}$$

$y = -x + 1$ ↑ START AT 1 ON Y-AXIS

RISE 1 / RUN −1 or RISE −1 / RUN 1

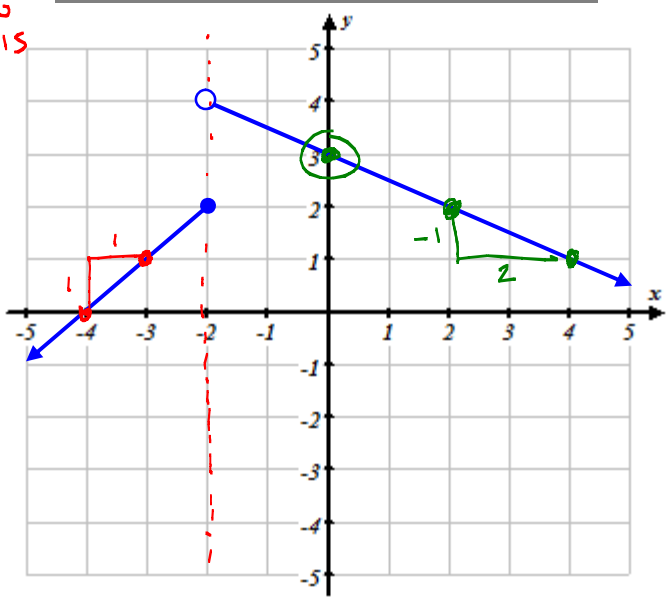
$y = 2x - 3$ ↑ START AT −3 ON Y-AXIS

RISE −2 / RUN −1 OR RISE 2 / RUN 1

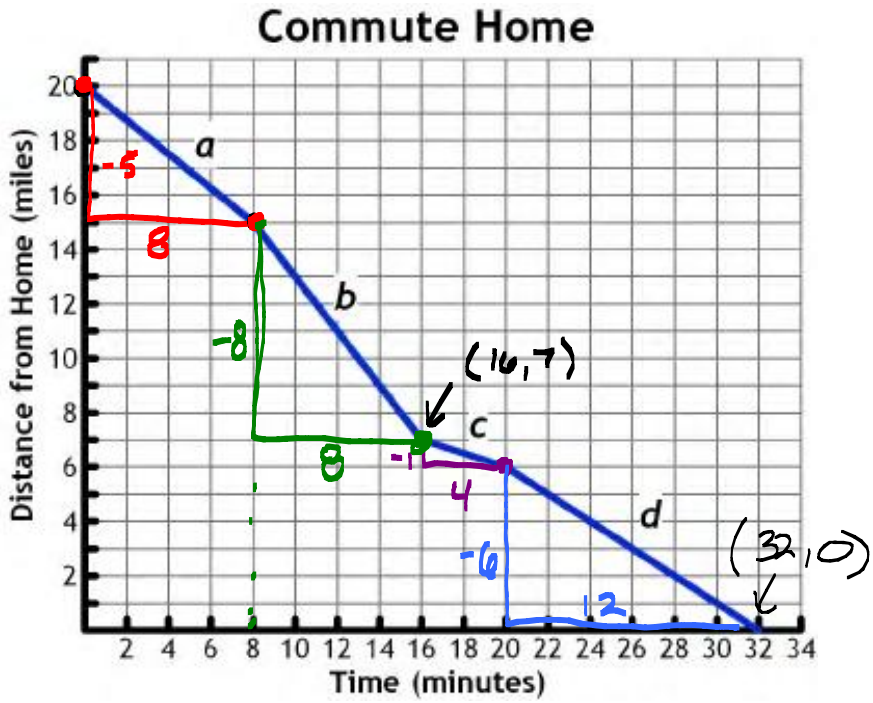


3. Determine the equation for the following piece-wise graph.

$$y = \begin{cases} 1x + 4 & \text{if } x \le -2 \\ -\frac{1}{2}x + 3 & \text{if } x > -2 \end{cases}$$



Mrs. Washington lives 20 miles from her office and drives her car to and from work every day. The graph below shows her distance from home over time as she drove home from work one day.



4. Write a dependency statement expressing the relationship between the two variables, distance and time.

Segment	Slope	Equation of Line	Domain	Range
a	$-\frac{5}{8}$	$y = mx + b$ $y = -\frac{5}{8}x + 20$	$0 \le x < 8$	$15 < y \le 20$
b	$\frac{-8}{8} = -1$	$y = -1x + b$ $(7) = -1(16) + b$ $7 = -16 + b$ $+16 \quad +16$ $23 = b$ PLUG IN $(16, 7)$ $y = -1x + 23$	$8 \le x < 16$	$7 < y \le 15$
c	$-\frac{1}{4}$	$y = -\frac{1}{4}x + b$ $(7) = -\frac{1}{4}(16) + b$ $7 = -4 + b$ $+4 \quad +4$ $11 = b$ PLUG IN $(16, 7)$ $y = -\frac{1}{4}x + 11$	$16 \le x < 20$	$6 < y \le 7$
d	$\frac{-6}{12} = -\frac{1}{2}$	$y = -\frac{1}{2}x + b$ $(0) = -\frac{1}{2}(32) + b$ $0 = -16 + b$ $+16 \quad +16$ $16 = b$ PLUG IN $(32, 0)$ $y = -\frac{1}{2}x + 16$	$20 \le x \le 32$	$0 \le y \le 6$

5. What does the slope of a line segment represent in the context of this situation?

IT REPRESENTS THE RATE OF VELOCITY HOME IN MILES PER MINUTE. THEY ARE ALL NEGATIVE BECAUSE THE DISTANCE AWAY FROM HOME IS GETTING SMALLER AND SMALLER AS TIME PROGRESSES.