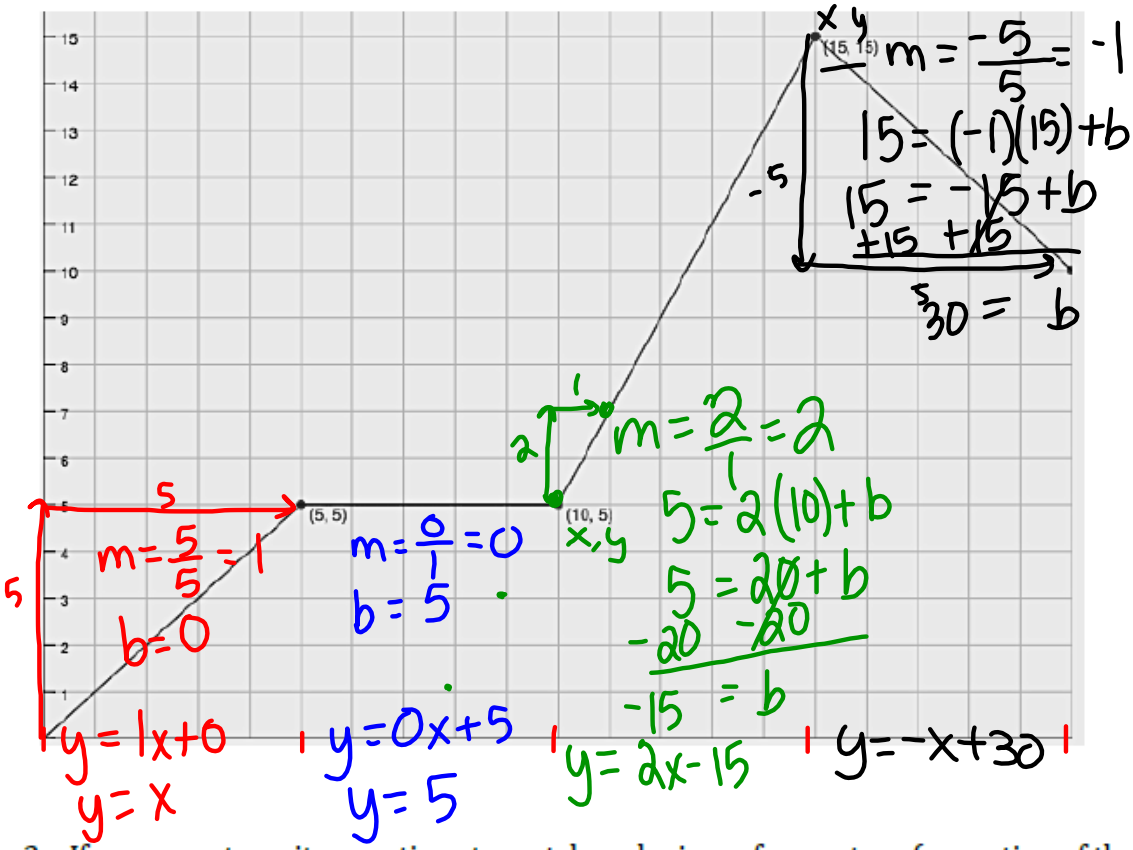
Make sure Ms. Hansen has your "Solving Quadratic Equations" worksheet. If not, bring it to her now. Look over lesson 4.1, we will go over questions shortly and move on.

4.1 Some of This, Some of That

A Develop Understanding Task

1. Create a story that would match the graph below. Be specific about what is happening for each part of your story. Include what you know about linear equations, domain, and rates of change.



2. If you were to write equations to match each piece of your story (or section of the graph), how many would you write? Explain.

4 equations

3. Write each of these equations. Explain how the equations connect to your story and to the graph.

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

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Ready

Topic: Reading function values in a piece-wise defined graph.

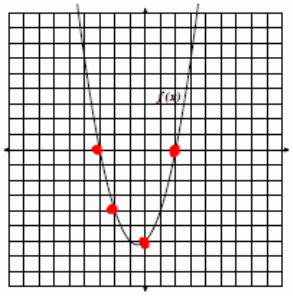
Use the graph to find the indicated function value.

1a. $f(-3) =$ 0

b. $f(-2) =$ -4

c. $f(0) =$ -6

d. $f(2) =$ 0

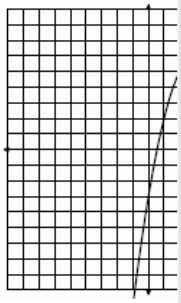


2a. $g(0) =$

b. $g(2) =$

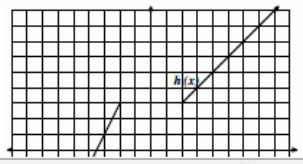
c. $g(3) =$

d. $g(5) =$



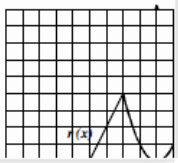
3a. $h(-4) =$

b. $h(0) =$



4a. $r(-3) =$

b. $r(-1) =$



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d. $h(4) =$

d. $r(5) =$

5. Isaac lives 3 miles away from his school. School ended at 3 pm and Isaac began his walk home v
friend Tate who lives 1 mile away from the school, in the direction of Isaac's house. Isaac stayed at
house for a while and then started home. On the way he stopped at the library. Then he hurried hc
graph at the right is a **piece-wise defined function** that shows Isaac's distance from home during t
took him to arrive home.

a. How much time passed between school ending and Isaac's arrival home?

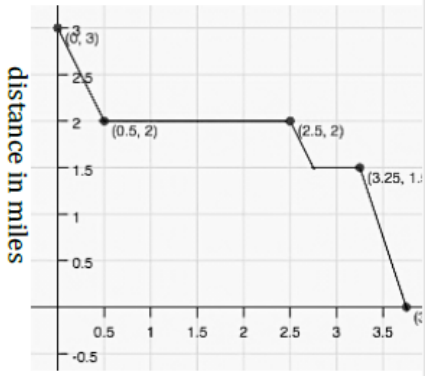
b. How long did Isaac stay at Tate's house?

c. How far is the library from Isaac's house?

d. Where was Isaac, 3 hours after school ended?

e. Use function notation to write a mathematical expression that says the same thing as question d.

f. When was Isaac walking the fastest? How fast was he walking?



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d. $h(4) =$

d. $r(5) =$

5. Isaac lives 3 miles away from his school. School ended at 3 pm and Isaac began his walk home with his friend Tate who lives 1 mile away from the school, in the direction of Isaac's house. Isaac stayed at Tate's house for a while and then started home. On the way he stopped at the library. Then he hurried home. The graph at the right is a **piece-wise defined function** that shows Isaac's distance from home during the time it took him to arrive home.

a. How much time passed between school ending and Isaac's arrival home?

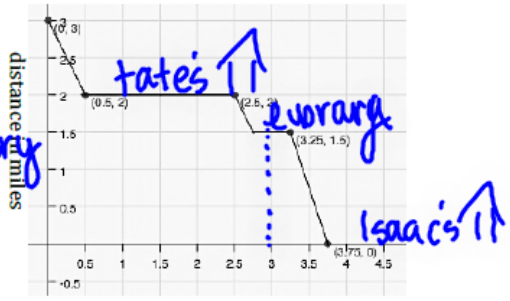
b. How long did Isaac stay at Tate's house?

c. How far is the library from Isaac's house?

d. Where was Isaac, 3 hours after school ended?

e. Use function notation to write a mathematical expression that says the same thing as question d.

f. When was Isaac walking the fastest? How fast was he walking?



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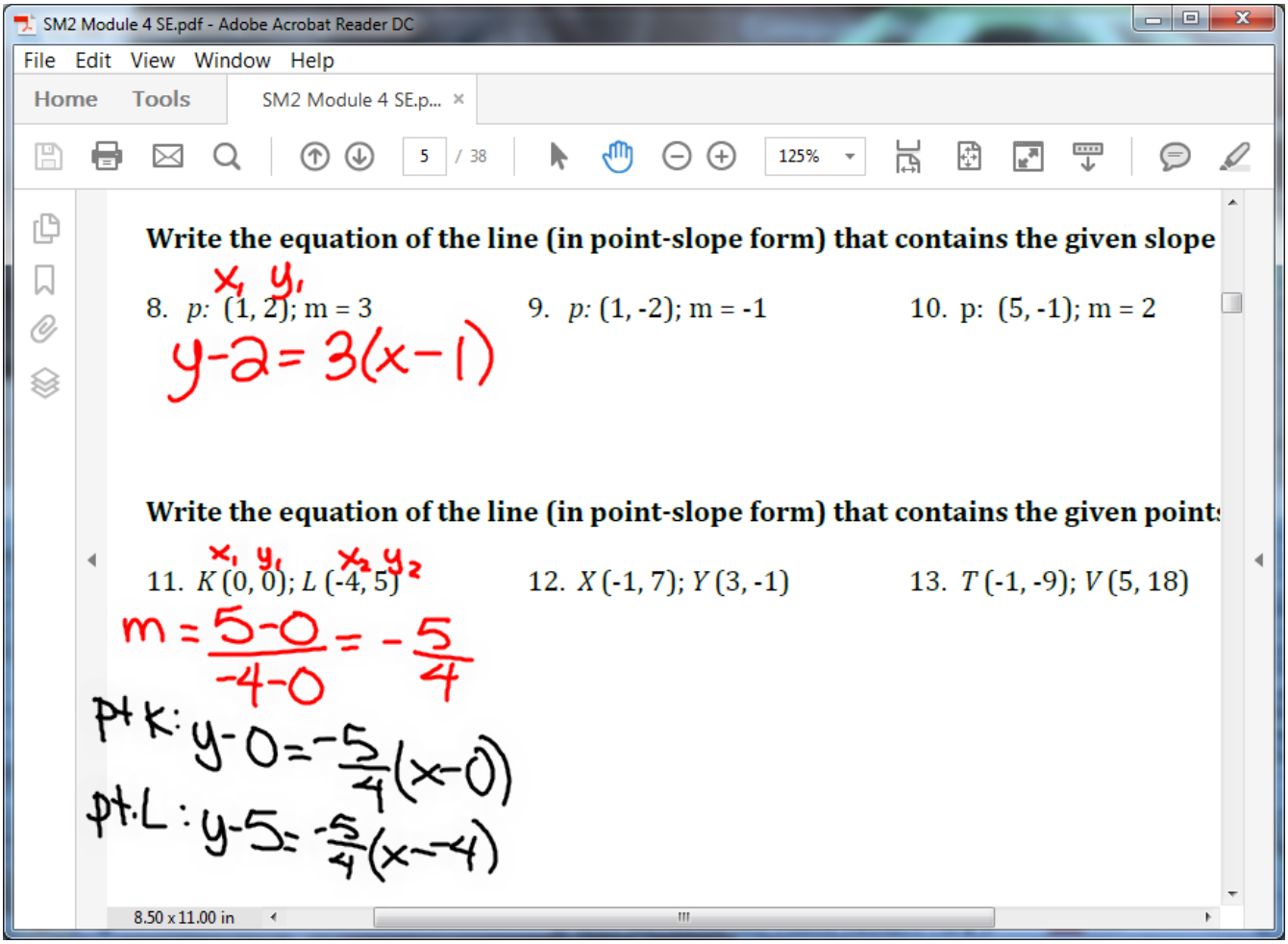
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Write the equation of the line (in point-slope form) that contains the given slope
8. p: (1, 2); m = 3
9. p: (1, -2); m = -1
10. p: (5, -1); m = 2
y-2=3(x-1)
Write the equation of the line (in point-slope form) that contains the given points
11. K (0, 0); L (-4, 5)
12. X (-1, 7); Y (3, -1)
13. T (-1, -9); V (5, 18)
m = 5-0 / -4-0 = -5/4
Pt K: y-0=-5/4(x-0)
Pt L: y-5=-5/4(x-4)
8.50 x 11.00 in

4.2 Bike Lovers

A Solidify Understanding Task

Michelle and Rashid love going on long bike rides. Every Saturday, they have a particular route they bike together that takes four hours. Below is a piecewise function that estimates the distance they travel for each hour of their bike ride.

$$f(x) = \begin{cases} 16x, & 0 < x \leq 1 \\ 10(x-1)+16, & 1 < x \leq 2 \\ 14(x-2)+26, & 2 < x \leq 3 \\ 12(x-3)+40, & 3 < x \leq 4 \end{cases}$$

x = time (in hours)

y or f(x) = distance (in miles).

1. What part of the bike ride do they go the fastest? Slowest?

bet. 0 & 1 hr bet. hour 1 & 2

hour 0-1: $16x$; $f(0)=0$; $f(1)=16\cdot 1=16$; $\frac{16\text{mi}}{1\text{hr}}$; $\frac{16-0}{1-0}$

hour 1-2: $10(x-1)+16$; $f(1)=16$; $f(2)=10(2-1)+16=26$; $\frac{10\text{mi}}{1\text{hr}}$; $\frac{26-16}{2-1}$

hour 2-3: $14(x-2)+26$; $f(2)=26$; $f(3)=14(3-2)+26=40$; $\frac{14\text{mi}}{1\text{hr}}$; $\frac{40-26}{3-2}$

hour 3-4: $12(x-3)+40$; $f(3)=40$; $f(4)=12(4-3)+40=52$; $\frac{12\text{mi}}{1\text{hr}}$; $\frac{52-40}{4-3}$

2. What is the domain of this function?

$0 < x \leq 4$ OR $(0,4]$

3. Find *f(2)*. Explain what this means in terms of the context.

$f(2)=26$ after 2 hours, they have biked 26 miles.

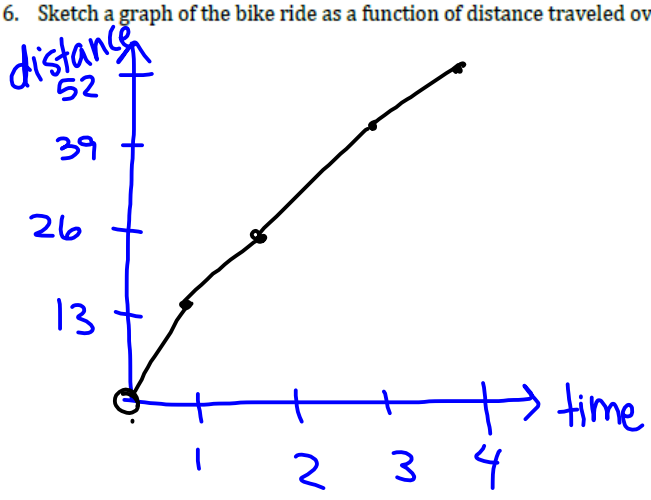
4. How far have they traveled at 3 hours? Write the answer using function notation.

40 miles; $f(3)=40$

5. What is the total distance they travel on this bike ride?

52 miles

6. Sketch a graph of the bike ride as a function of distance traveled over time.



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Rashid also has a route he likes to do on his own and has the following continuous piecewise function to represent the average distance he travels in minutes:

x = time (in minutes)
f(x) = distance

$$f(x) = \begin{cases} \frac{1}{4}(x) & 0 < x \leq 20 \\ \frac{1}{5}(x-20)+5 & 20 < x \leq 50 \\ \frac{2}{7}(x-50)+11 & 50 < x \leq 92 \\ \frac{1}{8}(x-a)+b & 92 < x \leq 100 \end{cases}$$

f(20) f(50) f(92) 23 92

7. What is the domain for this function? What does the domain tell us?

$0 < x \leq 100$ or $(0, 100]$ the # of minutes he biked.

8. What is the average rate of change during the interval [20, 50]?

$f(20) = \frac{1}{4}(20) = 5$

$f(50) = \frac{1}{5}(50-20)+5 = 11$

$\frac{11-5}{50-20} = \frac{6}{30} = \frac{1}{5}$

9. Over which time interval is the greatest average rate of change?

[50, 92]

10. Find the value of each, then complete each sentence frame:

a. $f(30) =$ 7. This means... his average distance in 30 mins is 7 miles

b. $f(64) =$ 15. This means... his average distance in 64 mins is 15 miles.

c. $f(10) =$ 2.5. When finding output values for given input values in a piecewise function, you must ... plug input value into the correct function.

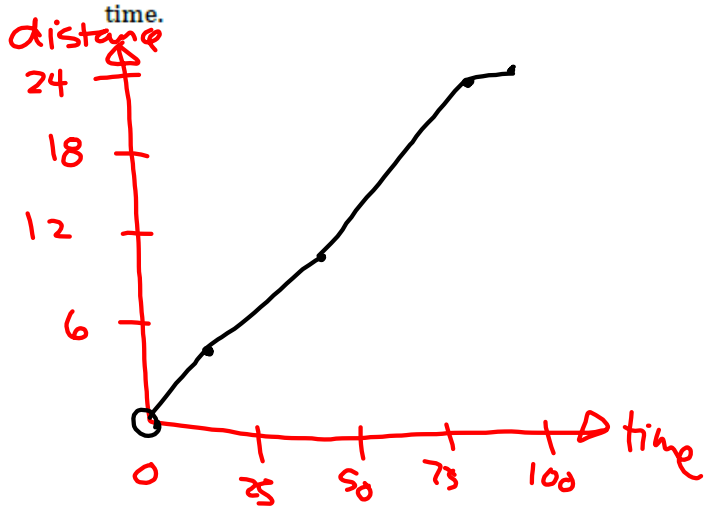
11. Find the value of a

92

12. Find the value of b

23

13. Sketch a graph of the bike ride as a function of distance traveled as a function of time.



Use the following continuous piecewise-defined function to answer the following questions.

$$f(x) = \begin{cases} \frac{1}{4}x^2 & 0 < x \leq 10 \\ \frac{1}{2}(x-10)+c & 10 < x \leq 20 \\ 2(x-20)+30 & 20 < x \leq 30 \end{cases}$$

14. Find the value of c.

15. Sketch the graph.

16. What is the domain of ~~g~~ $f(x)$?

17. What is the range of ~~g~~ $f(x)$?

18. Find $f(8)$.

19. Find $f(15)$.

Dec 7-8:33 AM

Homework

Finish 4.2 "Ready, Set, Go"

Mar 28-9:36 AM