Friday, January 13 is the last day Ms. Hansen will accept any late/missing/extra credit work for 2nd quarter

-->This includes any test/quiz retakes

4.1 through 4.4 homework should all be complete, so look through your book and make sure it is completed.

4.5 What's Your Pace?

A Develop Understanding Task

Chandler and Isaac both like to ride bikes for exercise. They were discussing whether or not they have a similar pace so that they could plan a time to bike together. Chandler said she bikes about 12 miles per hour (or 12 miles in 60 minutes). Isaac looked confused and said he does not know how many miles he bikes in an hour because he calculates his pace differently.

x y

1. Using Chandler's information, determine the independent and dependent variables.

Independent : time

dependent : distance

2. Since Chandler uses time to determine the distance she travels, determine how far she will go in 1 minute? 5 minutes? 10 minutes? 20 minutes? 30 minutes? t minutes?

$\frac{12 \text{ mi}}{60 \text{ min.}} = \frac{1}{5}$

t	1	5	10	20	30	60	t
$d(t)$	$\frac{1}{5}$ or 0.2	1	2	4	6	12	$\frac{1}{5}t$

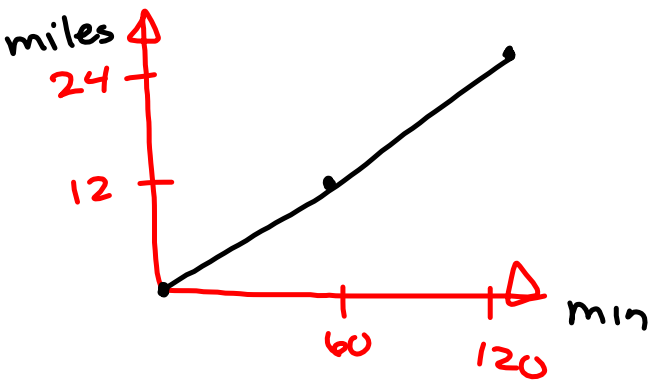
÷60 ×12 ×2 ×3 ×2 ×3 ÷60

3. Write the equation for Chandler's pace using time (in minutes) as the independent variable and distance (in miles)as the dependent variable. $d(t) =$ $\frac{1}{5}t + 0$

$\frac{12 \text{ mi}}{60 \text{ mins}}$ or $\frac{1 \text{ mi}}{5 \text{ min}}$

$d(t) = \frac{1}{5}t$

4. Sketch a graph for this situation whose domain goes from [0,120].



Isaac says he calculates his pace differently. He explains that he bikes a five minute mile, meaning that for every five minutes he bikes, he has travels one mile.

5. How is this different than how Chandler describes her rate?

5mins / 1mile

Rates are reciprocals → $\frac{1\text{mi}}{5\text{min}}$ ↔ $\frac{5\text{min}}{1\text{mi}}$

Chand. Isaac

6. Who goes at a faster rate? Explain.

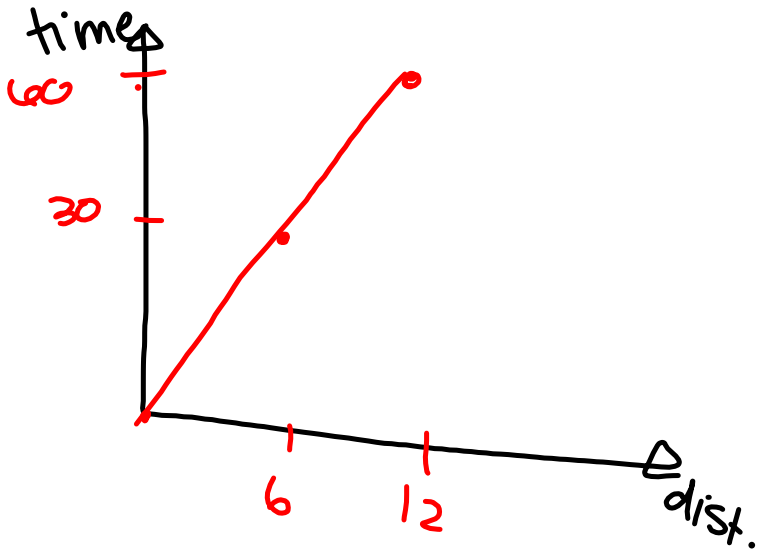
Neither; both are travelling 1mile in 5minutes.

7. Since Isaac uses distance to determine how long he has ridden, determine how long it will take him to travel 1 mile? 2 miles? *d* miles? (complete the table)

d	1	2	4	5	6	12	*d*
t(d)	5	10	20	25	30	60	5d

8. Write the equation for Isaac's pace using miles as the independent variable and minutes as the dependent variable. *t(d)* = 5d

9. Sketch a graph of Isaac's function. As always, be sure to label.



You may have noticed that Isaac and Chandler actually bike at the same pace, which means their functions would be exactly the same if they had not 'switched' their independent and dependent variables around from each other. When this happens, functions are said to be *inverse functions* of each other. When this happens, the original function can be written as $f(x)$ and the inverse function can be written as $f^{-1}(x)$.

"f inverse of x" $f^{-1}(x)$

10. Using the equations, tables, and graphs, make a list of observations of what happens when you have two functions that are inverses of each other.

linear functions & their inverses...

- have reciprocal slopes
- independent & dependent variables switch
- x points become the y points and vice versa (in table)
  - → (12,60) ↔ (60,12)
  - → (1,5) ↔ (5,1)

11. Why do you think inverse functions have these characteristics?

They are similar to inverse operations & "undo" each other.

Homework

Finish 4.5 "Ready, Set, Go"

Mar 28-9:36 AM