2.E.2

Name "Teacher" d# 42 Date January 8, 2017 ~~1.E.3.8~~

Linear Equations - Direct Variation b

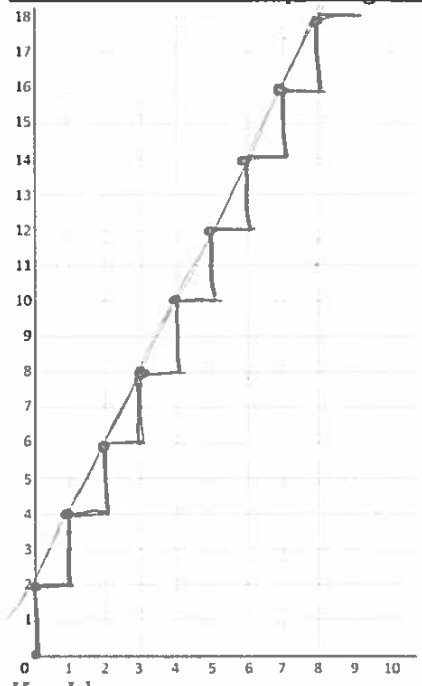
Ms. Draper's Prius was running on empty, so she stopped to fill her tank. The gas cost $2 per gallon. Write a slope-intercept form equation for the scenario. What do you notice? b=0

x: gallons
y: money

$y = mx + b$
$y = 2x + 0$

start @ (0, 0)

Model the relationship using the graph and table. Complete the task in the text box.



X: gal	Y: $
0	0
2	4
4	8
6	12
8	16

+2, +4

$m = \frac{4}{2} = 2$

$\frac{rise}{run} = \frac{2}{1}$

Find the ratio of each output to each input. Compare to the slope.

$\frac{y}{x} = \frac{4}{2} = \frac{8}{4} = \frac{12}{16} = \frac{16}{8}$

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

$m = 2 \quad \frac{\Delta y}{\Delta x} = m$

Same!

Key Ideas

What is this type of relationship called?	① Direct variation: Two variables have a constant ratio They're proportional.
What does its graph look like?	straight line going through (0,0)
What is its general equation?	$y = mx + b$ where $b = 0 \Rightarrow y = kx$ $k = \frac{y}{x}$ $m = \frac{\Delta y}{\Delta x}$
What is its slope called?	k is the constant of variation
Why is the slope special?	$m = \frac{\Delta y}{\Delta x} = \frac{y}{x} = k$
How can you check for this type of relationship?	Determine if the ratio of output to input is constant check if (0,0) is a point on the graph or in equation

Find the slope of the linear relationship. Determine if the relationship is direct variation. If so, identify the **constant of variation** and write the direct variation equation.

(1)

x	y
5	15
6	18
7	21
8	24

$K = \frac{15}{5} = \frac{18}{6} = 3$

$y = 3x$

(2) (3)

Temp-erature (°C)	Volume of Gas (mL)
20	60
40	65
60	70
80	75
100	80

+20, +20, +20, +20 | +5, +5, +5, +5

$m = \frac{5}{20} \div 5 = \frac{1}{4}$

not dir. var.

Cups of Sugar	Cups of Flour
2	3
4	6
6	9
8	12
10	15

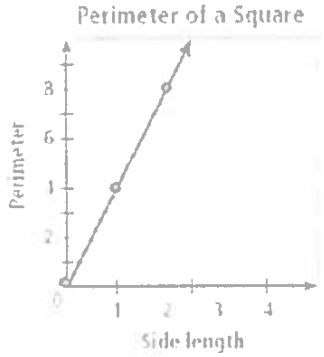
+2, +2, +2, +2 | +3, +3, +3, +3

$K = \frac{3}{2} = \frac{6}{4} = \frac{9}{6} = 1.5$

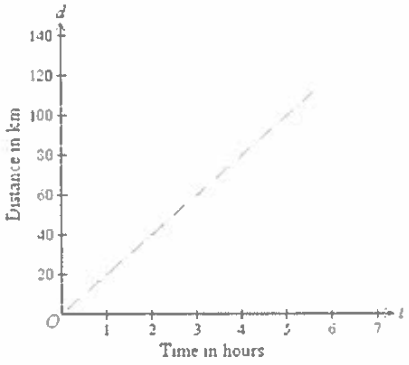
$y = 1.5x$

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

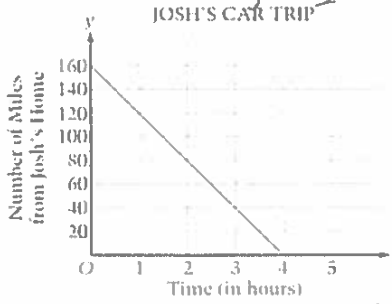
(4)



(5)



(6)



NO! does not go through (0,0)

Define your variables. Write the direct variation equation given the relationship.

(7) Marcia used a recipe that called for 3 sticks of butter for every 2 cups of sugar. Write a direct variation equation for the butter she needs to use depending on how much sugar she uses.

x: Cups of sugar
y: Sticks of butter

$y = kx$

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

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

(8) Harry works for minimum wage. After an 8-hour shift, he has earned $61.20. Write a direct variation equation for how much Harry makes depending on the hours he works.

x: Hours
y: money

$y = kx$

$k = \frac{y}{x} = \frac{61.20}{8}$

$y = \$7.65x$

$k = \$7.65$/per hour

(9) Ciara applies makeup daily. She uses 0.25 ounces of foundation every morning. Write a direct variation equation for how much makeup Ciara has used depending on the number of days she has applied makeup.

$y = kx$

x: Numbers of days
y: Ounces of foundation (how much make-up)

$y = 0.25x$