5.2 Extension: Graphing Proportional Relationships p.176

RPJ p. 93 – make graphs for each ratio table
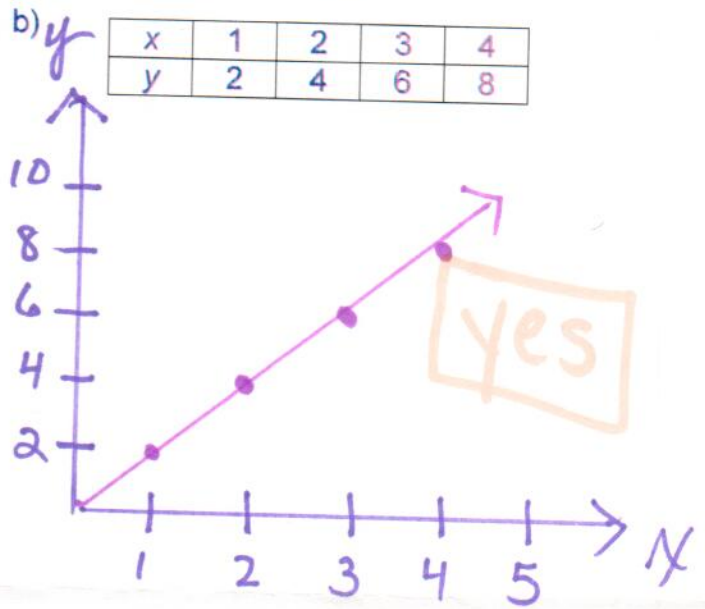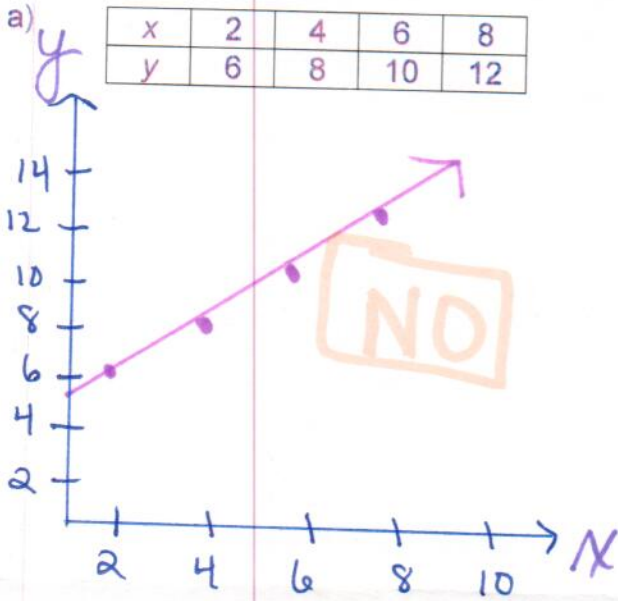
The graph of a proportional relationship is a straight line going through the origin (0,0).

The graph shows a CONSTANT RATE OF CHANGE.

$\frac{y}{x}$

↳ unit rate | constant of proportionality (K)

Use a graph to tell whether x and y are in a proportional relationship.

a)

x	2	4	6	8
y	6	8	10	12

NO

b)

x	1	2	3	4
y	2	4	6	8

yes

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The graph shows that the distance traveled
By the Mars rover Curiosity is proportional
to the time traveled. Interpret each plotted
point on the graph. $\frac{y}{x}$

→ What does it mean?

Curiosity Rover at Top Speed

(3, 4.5)
(1, 1.5)
(0, 0)

Distance (inches)
Time (seconds)

(0,0) 0 inches in 0 seconds

(1, 1.5) 1.5 inches in 1 second

(3, 4.5) 4.5 inches in 3 seconds

(x, y)

When x is 1, that is the unit rate (K).

1.5 inches/ second
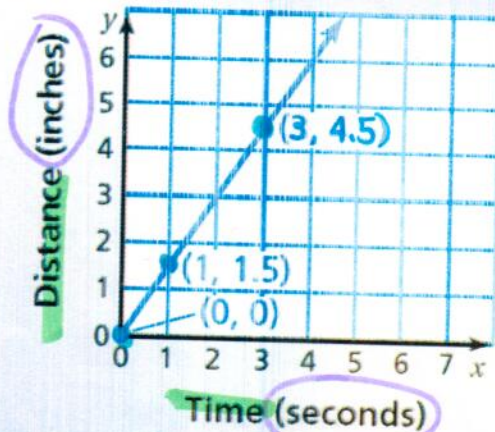
When x is 1, the y value is the unit rate in a proportional (and k) relationship represented by $(1, y)$. Find y: $\frac{y}{x}$

1. $(6,12)$, $(1, y)$ $\frac{12}{6}$ $\boxed{y = 2}$

2. $(2.5, 10)$, $(1, y)$ $\frac{10}{2.5}$ $\boxed{y = 4}$

3. $(1.5, 4.5)$, $(1, y)$ $\frac{4.5}{1.5}$ $\boxed{y = 3}$

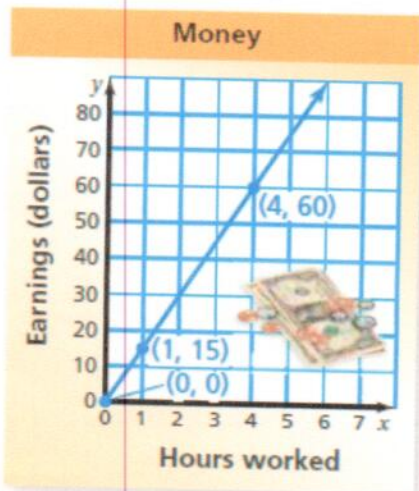4. $(8, 26)$, $(1, y)$ $\frac{26}{8}$ $\boxed{y = 3.25}$

5. $(12, 40)$, $(1, y)$ $\frac{40}{12}$ $\boxed{y = 3\frac{1}{3}}$

↳ repeating decimals must be written as a fraction

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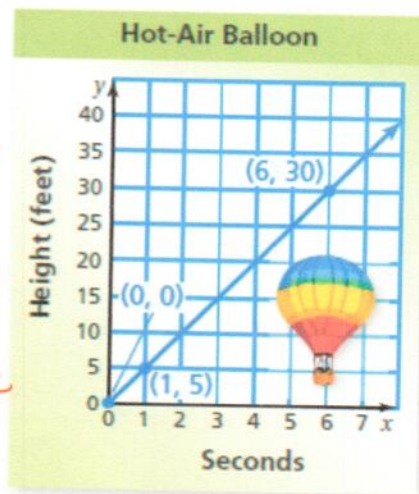**Interpret each plotted point in the graph of the proportional relationship.**

3.

$(0,0)$
0 in 0 hours

$(1,15)$
$15 in 1 hour

$(4,60)$
$60 in 4 hours

$\boxed{\$15/hr}$

Money

Earnings (dollars) vs Hours worked
Points: (4, 60), (1, 15), (0, 0)

4.

$(0,0)$
0 ft in 0 sec

$(1,5)$
5 ft in 1 sec

$(6,30)$
30 ft in 6 sec

$\boxed{5ft/sec}$

Hot-Air Balloon

Height (feet) vs Seconds
Points: (6, 30), (0, 0), (1, 5)

What is the unit rate for 3 + 4?

Tell whether x and y are in a proportional relationship. If so, find the unit rate.

5.

x (hours)	1	4	7	10
y (feet)	5	20	35	50

yes; 5 ft/h

6. Let y be the temperature x hours after midnight. The temperature is 60°F at midnight and decreases 2°F every $\frac{1}{2}$ hour.

no; won't go through the origin

7. **REASONING** The graph of a proportional relationship passes through $(12, 16)$ and $(1, y)$. Find y. $y = \frac{4}{3}$

8. **MOVIE RENTAL** You pay $1 to rent a movie plus an additional $0.50 per day until you return the movie. Your friend pays $1.25 per day to rent a movie.

a. Make tables showing the costs to rent a movie up to 5 days. $x =$ days $y =$ cost $

b. Which person pays an amount proportional to the number of days rented?

your friend

you

x	y
1	.50
2	2.00
3	2.50
4	3.00
5	3.50

friend

x	y
1	1.25
2	2.50
3	3.75
4	5.00
5	6.25