Name **Key**

ACCELERATED

Unit 3 Study Guide (7th Grade Math)

1. Mariah is buying grapes. She bought 3 pounds and spent $7.84. How much did the grapes cost per pound?

$$\text{cost per pound} = \frac{\text{cost}}{\text{pound}} = \frac{\$7.84}{3 \text{ pounds}} = \boxed{\$2.61 \text{ per pound}}$$ — unit rate!"

2. Romeo is driving to Nashville. It is 457 miles away. It took him 6.5 hours. What was his average speed in miles per hour?

$$\text{miles per hour} = \frac{\text{miles}}{\text{hour}} = \frac{457 \text{ miles}}{6.5 \text{ hours}} = \boxed{70.3 \approx 70 \text{ miles per hour}}$$
unit rate!

3. The table shows a person spending money at a constant rate.

# of months	1	2	3	4
Total $ spent	50	100	150	200

a.) How much is this person spending per month? $\frac{y}{x} = \frac{50}{1} = 50$ — $\boxed{\$50 \text{ per month}}$ unit rate!"

b.) How much will this person spend in ½ year? $\$50 - 1$ ~~month~~

$\$300$ spent in ½ year ⤳ multiply by 6 $\$50 \times 6 = \$300$ spent in ½ year

4. This table shows a person saving at a constant rate.

Days	10	20	30	40
Total Savings ($)	30	60	90	120

a.) How much is this person saving per day? $\frac{y}{x} = \frac{30}{10} = \boxed{\$3/\text{day} \ (\$3 \text{ per day})}$
Again, this is the unit rate!"

b.) How much will this person save in 2 months? $\boxed{\$180}$

convert months to days
(consider it to be a month that has 30 days)

$\frac{30 \text{ days}}{1 \text{ month}} \times 2 \text{ months} = 60 \text{ days in 2 months}$

→ $60 \text{ days} \times \$3/\text{day} = \boxed{\$180}$

5. Select True of False for each of the following statements about the table below.

Age in Years	0	1	2	3
Weight in pounds	8	20	25	35

T/F The ratio of x:y equals 1:20   *False*
T/F The ratio x:y is not constant   *True*
T/F The ratio x:y is constant   *False*
T/F The savings does not stay constant   *True*

Difficult question — you can do it!

6. Julio eats 1/8 of a pizza in 1/3 of a minute. If he continues at the same rate, how long will it take him to eat the entire pizza???

$$\frac{\frac{1}{8}}{\frac{1}{3}} = \frac{1}{8} \times \frac{3}{1} = \frac{3}{8}$$ of a pizza eaten in one minute

$\frac{3}{8}$ — 1 min + $\frac{3}{8}$ — 1 min = $\frac{6}{8}$ = $\frac{3}{4}$ pizza eaten in 2 min.

About 2 min. 30 seconds $+\frac{3}{8}$ $\frac{9}{8}$ — eaten in 3 min.

7. A nutritional label show that cereal has 120 calories in ¾ cup. How many calories are in ¼ cup?

$$\frac{\overset{40}{120} \text{ calories}}{1} \times \frac{4}{\overset{}{\cancel{3}1}}$$ — KCF-dividing fractions

= 160 calories in 1 cup

160 calories ÷ 4 = 40 calories in ¼ cup

[40 calories in ¼ cup]

or this can be written as 160 × $\frac{1}{4}$.

8. On a map, Florida is 7 ½ inches away from Jefferson City. If each ½ inch stands for 100 miles, how many miles away from Jeff City is Florida?

$\frac{1}{2}$ in. = 100 miles
$7\frac{1}{2}$ in. = ? miles

$7\frac{1}{2} \div \frac{1}{2} = \frac{15}{2} \times \frac{2}{1} = 15$

100 × 15 = [1,500 miles]

can also think of it as 200 miles/inch

$\frac{200 \text{ miles} \times 7.5}{1 \text{ inch}}$ = [1500 miles]

9. To grade 100 tests, it takes Mrs. Phillips 2.5 hours. Ms. Basnett grades at a speed that is proportional to Mrs. Phillips. If she only has 1.5 hours to grade tests before she goes to bed, how many tests can Ms. Basnett expect to get graded?

Mrs. Phillip's Unit Rate for grading tests: $\frac{100 \text{ tests}}{2.5 \text{ hours}} = \frac{40 \text{ tests}}{1 \text{ hour}}$

Ms. Basnett: $\frac{40 \text{ tests}}{1 \text{ hour}} \times 1.5 \text{ hours} = $ [60 tests graded in 1.5 hours]

10. The table shows Kristen's pay for 8 hours of work. Two entries are missing, fill in the empty boxes.

| Number of hours	Pay
0.5	11
1.5 (33 ÷ 22 = 1.5)	33
5	110 ($22 × 5 = $110)
8	176

a.) What is Kristen's pay per hour? $\frac{11}{.5} = \frac{11}{\frac{1}{2}} = 11 \times 2 = 22 ($22 per hour) $\frac{33}{x} = \frac{22}{1}$ KCF 1hr $\frac{22x}{22} = \frac{33}{22}$ x = 1.5

b.) Find the number of hours Kristen worked if she got paid $770. $\frac{$770}{x} ⤫ \frac{$22}{1}$ cross multiply

35 hours worked

$\frac{22x}{22} = \frac{770}{22}$

11. The graph shows the total miles driven on a family road trip.

x = 35 → 35 hours

Family Road Trip
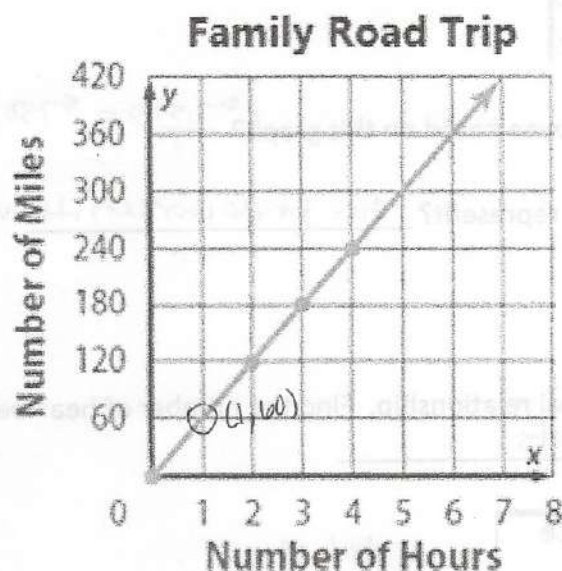
a) How many miles per hour does the family drive? $\frac{y}{x} = \frac{60}{1} = 60$ miles per hour

b) Does this graph represent a proportional relationship? Explain your reasoning.

Yes this graph represents a proportional relationship because it goes at a constant rate of 60 miles every hour (60 is the constant of proportionality) and the graph goes through the origin (0,0)

12. The graph below shows the Weekly Costs for workers.
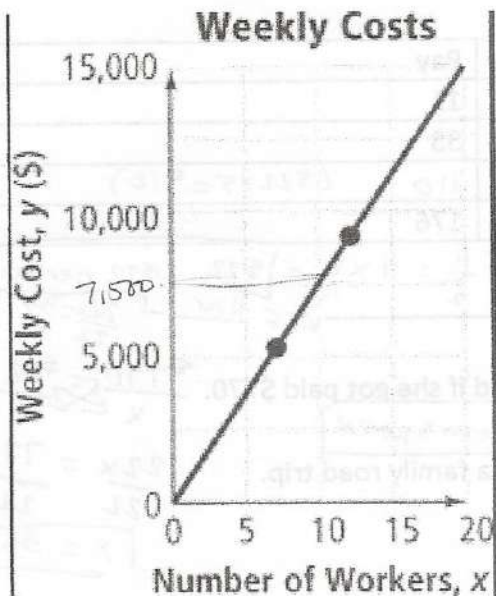
Weekly Costs

$10,000 + 5,000 = 15,000 \div 2$
$= \$7,500$

— The line between $5,000 & 10,000 is $7,500.

a) How much does it cost per employee based on this graph? $\frac{\$7,500}{10} = \$750/\text{employee}$
   $\$750/\text{employee}$

b) What does the point (20, 15000) represent? That for 20 workers, the weekly cost was $15,000.

13. The graph below shows a proportional relationship. Find the number of heartbeats for 8 seconds. ___12 heartbeats___
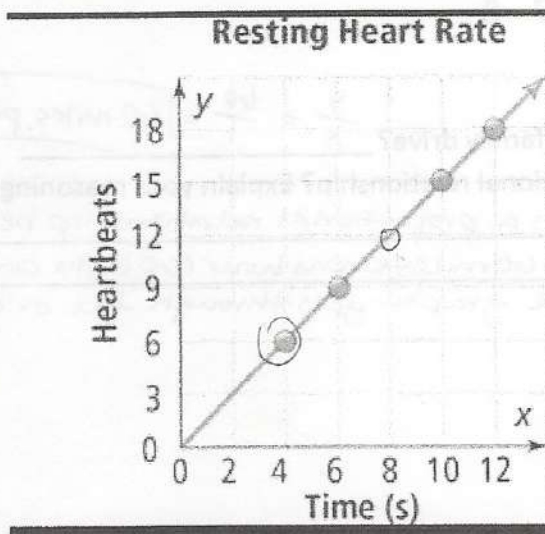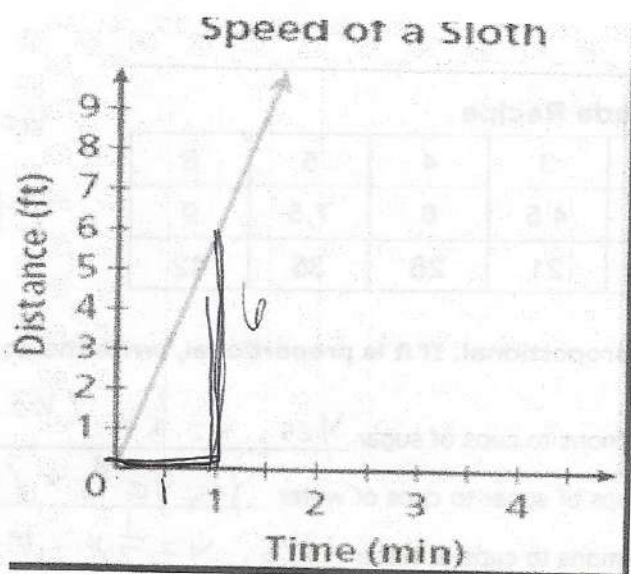

Method 1:

$\frac{6 \text{ heartbeats}}{4 \text{ seconds}} = \frac{1.5 \text{ heartbeats}}{\text{second}} \times 8 \text{ seconds}$
$= 12 \text{ heartbeats in 8 seconds}$

Method 2: Find point on graph where x = 8 seconds & find y-value which is at 12 heartbeats

14. The graph below shows the speed of a sloth. What is the rate of change from 1-~~second~~ to 2-~~seconds~~? Use $\frac{y_2-y_1}{x_2-x_1}$. Or you can just use $\frac{rise}{run}$. (It's the
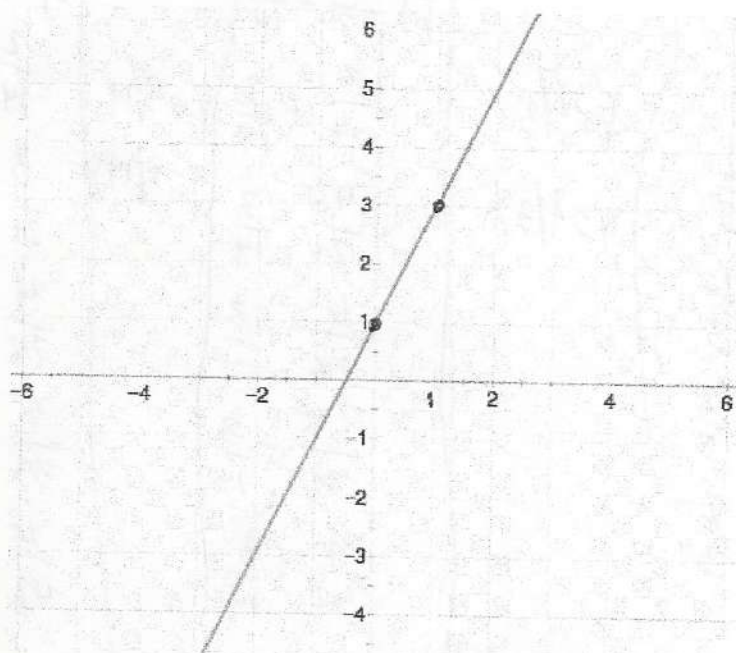
minute   minutes

same thing)

Speed of a Sloth

$$\frac{Rise}{Run} = \frac{Y_2-Y_1}{X_2-X_1} = \frac{6-0}{1-0} = \frac{6}{1} = 6$$

$$\boxed{6\,ft/second}$$

$$\frac{Rise}{Run} \underset{2-1}{\overset{1\ minute\ to\ 2\ minutes}{\longrightarrow}} \frac{12-6}{2-1} = \frac{6}{1} = 6$$

15. What is the slope of the line?

$$\frac{Rise}{Run} = \frac{Y_2-Y_1}{X_2-X_1} = \frac{3-1}{1-0} = \frac{2}{1} = 2$$

$$\boxed{slope = 2}$$

** I apologize for the formatting. This is obviously question #16. Just go with it. ☺

Use the table to answer 16.

Lemonade Recipe

Lemons	1	2	3	4	5	6
Sugar (cups)	1.5	3	4.5	6	7.5	9
Water (cups)	7	14	21	28	35	42

$k = \dfrac{y}{x}$

$y = kx$

Tell whether each relationship is proportional. If it is proportional, write the equation for the relationship.

16.

a. the ratio of lemons to cups of sugar $\underline{\text{Yes, } y = \frac{2}{3}x \quad (k = \frac{2}{3})}$

b. the ratio of cups of sugar to cups of water $\underline{\text{Yes, } y = \frac{3}{14}x \quad (k = 3/14)}$

c. the ratio of lemons to cups of water $\underline{\text{Yes, } y = \frac{1}{7}x \quad (k = \frac{1}{7})}$

a) $\dfrac{1}{1.5} = \dfrac{2}{3}$

$\dfrac{2}{3} = \dfrac{2}{3}$

$\dfrac{3}{4.5} = \dfrac{2}{3}$

$\dfrac{4}{6} = \dfrac{2}{3}$

$\dfrac{5}{7.5} = \dfrac{2}{3}$

$\dfrac{6}{9} = \dfrac{2}{3}$

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

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

b) $\dfrac{1.5}{7} = \dfrac{3}{14}$

$\dfrac{3}{14} = \dfrac{3}{14}$

$\dfrac{4.5}{21} = \dfrac{3}{14}$

$\dfrac{6}{28} = \dfrac{3}{14}$

$\dfrac{7.5}{35} = \dfrac{3}{14}$

$\dfrac{9}{42} = \dfrac{3}{14}$

$k = 3/14$

$y = 3/14 x$

c) $\dfrac{1}{7} = \dfrac{1}{7}$

$\dfrac{2}{14} = \dfrac{1}{7}$

$\dfrac{3}{21} = \dfrac{1}{7}$

$\dfrac{4}{28} = \dfrac{1}{7}$

$\dfrac{5}{35} = \dfrac{1}{7}$

$\dfrac{6}{42} = \dfrac{1}{7}$

$k = \frac{1}{7}$

$y = \frac{1}{7}x$