The graph below shows the monthly cost of a cell phone bill depending on how many text messages are sent. Use the graph to answer questions 1-3.

1.) Is the cost of the cell phone bill directly proportional to the number of text messages sent? Explain using two pieces of evidence to justify your answer.

2.) What is the constant of proportionality for this relationship?

3.) Write an equation that could be used to represent the cost of the bill \( y \) after \( x \) text messages have been sent.

The graph below displays the amount of money an Internet company will make after a given number of years of operation. Use the graph to answer questions 4-6.

4.) Explain what the coordinate \( (1, 0.7) \) represents in this situation.

5.) If an Internet company were in operation for 16 years, how many millions of dollars can it expect to make?

6.) If an Internet company were in operation for 4 years, but had to pay 30% of its earning in taxes, how much money would it have left after taxes? Show your work.
The graph below shows the relationship between the number of tickets sold for a concert and the amount of money, in dollars, collected from the sales of the first 30 tickets. Use the graph to answer questions 7-9.

7.) Write an equation that can be used to calculate $y$, the amount of money collected for $x$ tickets sold.

8.) If the band sells 250 tickets, and gets to keep 40% of the money collected, how much money will the band get to keep?

9.) If the amount of money collected was $748, how many tickets were sold?

The graph below shows speed that a turtle (A) travels, and the speed that a snail (B) travels in meters per second. Use the graph to answer questions 10-11

10.) Which animal is faster? Explain.

11.) If the relationship between distance and time for the snail can be represented by the equation $y=0.35x$, which of the following equations could represent the relationship between distance and time for the turtle?

   a. $y = 0.3x$  
   b. $y = 0.5x$  
   c. $y = 0.175x$  
   d. $y = 0.25x$

12.) Melissa is making a punch for her birthday party. The recipe requires $\frac{3}{5}$ cups of orange juice for every $\frac{1}{4}$ cup of cranberry juice. If Melissa uses $1\frac{1}{2}$ cups of orange juice, how many cups of cranberry juice should she use? Show all work.
13.) Here is a recipe for making 4 pancakes:

- 6 tablespoons flour
- ¼ pint milk
- ¼ pint water
- 1 pinch salt
- 1 egg

If you want to make 10 pancakes, how much of each ingredient will you need?

The graph below shows the number of acts of vandalism in Smalltown, USA during six different months. Use the information in the graph to answer questions 14 - 16.

![Graph showing the number of acts of vandalism in Smalltown, USA during six months with data points for January to June: January 8, February 15, March 19, April 24, May 21, June 28.]

14.) By what percent did the number of acts of vandalism change by from January to February?

15.) Calculate the percent decrease in the number of vandals from April to May.

16.) What was the percent increase in number of vandals from February to April?

Decide whether each table below represents a proportional relationship, and explain how you know.

17.)

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18.)

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22.)
The graph below shows the amount of fruit juice available (in millions of gallons) each year in the United States. Use the data in the graph to answer questions 23-24.

![Fruit Juice Available Graph]

23.) By what percentage did the amount of fruit juice available decrease from 2001 to 2002? Round your answer to the nearest whole percentage.

24.) What was the percent change in fruit juice available between the years 2002 and 2003?

**Calculate the unit rate for each situation:**

25.) There are 240 calories in 8 cookies. How many calories are in each cookie?

26.) Bill types 28 words in 3.5 minutes. How many words can he type in one minute?

27.) A pool fills with water at a rate of 5¼ gallon every ¾ minute. How many gallons fill the pool in one minute?

28.) A dog drinks ¼ cup of water every ¾ of an hour. How many cups of water will the dog drink in one hour?

**Use proportional reasoning to answer each question:**

29.) A car is traveling at a speed of 25mph. How long will it take the car to travel 10 miles?

30.) Mario spent 40% of his weekly allowance on candy. If Mario spent $8.00 on candy, what is his weekly allowance?

31.) Julie buys a new shirt. The original price of the shirt is $35.00, but it is on sale for 25% off. There is a 7% tax on the shirt. How much will Julie pay for the shirt?

32.) Natalie runs at a rate of ⅞ miles in ⅏ of an hour. At this rate, how long will it take her to run 2½ miles?
Answers to study guide:

1.) The cost is directly proportional to the number of text messages sent. It is a linear relationship that starts at the origin, the ratio of text messages to cost of bill is always the same, and the unit rate or constant of proportionality could be used to determine the cost of a bill given any number of text messages sent.

2.) $K = 2$

3.) $Y = 2x$

4.) This is the unit rate, or constant of proportionality. This point represents the amount of earnings (0.7 million) in the first year of operation.

5.) 11.2 million dollars in 16 years.

6.) 1.96 million dollars

7.) $y = 2x$

8.) $200$

9.) 374 tickets

10.) The turtle is faster because he travels more meters in the same amount of time. The turtles unit rate is greater than the snail’s.

11.) b. $y = 0.5x$

12.) $\frac{3}{4}$ cups cranberry juice

13.) 15 tablespoons of flour, $\frac{3}{8}$ pint of milk, $\frac{5}{8}$ pint of water, 2.5 pinches of salt, 2.5 eggs.

14.) 87.5% increase

15.) 12.5% decrease

16.) 60% increase

17.) This table is proportional, the common ratio of x to y is 4:1, and x and y would both equal zero at the same time.

18.) This table is not proportional, there is not a common ratio between x and y, and x and y do not equal zero at the same time.

19.) This table is not proportional, there is not a common ratio between x and y, and x and y do not equal zero at the same time.

20.) This table is not proportional, there is not a common ratio between x and y, and x and y do not equal zero at the same time.

21.) This table is not proportional b/c there is not a common ratio between x and y.

22.) This table is proportional because there is a common ratio between x and y of 1:3, and x and y both equal zero at the same time.

23.) about a 12% decrease

24.) 7.5% increase
25.) 30 calories per cookie
26.) 8 words per minute
27.) 7 ⅝ gallons
28.) ⅝ cups
29.) 24 minutes
30.) $20.00
31.) $28.09
32.) ¾ hour or 40 minutes