

Direct Variation 8-9

Day 2

Name- _____

(x_1, y_1) and (x_2, y_2) are ordered pairs of the same direct variation.

Find each missing value.

- | | | | |
|----------------|---------------|---------------|----------------------------------|
| 1) $(45, y_1)$ | 2) $(3.6, 3)$ | 3) $(x_1, 7)$ | 4) $(\frac{1}{10}, \frac{1}{6})$ |
| $(60, 100)$ | $(x_2, 1)$ | $(7.65, 9)$ | $(\frac{2}{5}, y_2)$ |

For each of the following:

- write as a ratio equal to the constant of variation,
 - and write the constant as a fraction in lowest terms or as a decimal rounded to the nearest thousandth.
- The length of a shadow cast by a tree varies directly as the height of the tree. Currently a tree 20 feet tall casts a 14 foot shadow.
 - The heat required to melt a substance varies directly as its mass. Forty-nine calories of heat are needed to melt one gram of copper.
 - At any given temperature, the electrical resistance of a wire is directly proportional to the length. At 20°C , 500 m of No. 18 gauge copper wire has a resistance of 10.295 ohms.
 - Under constant pressure, the volume, V , of a dry gas is directly proportional to its temperature, T , in Kelvin. A sample of oxygen occupies a volume of 5 L at 300 K.

Solve.

- An employee's wages are directly proportional to the time worked. If an employee earns \$100 for 5 h, how much will the employee earn for 18 h?
- A certain car uses 15 gal of gasoline in 3 h. If the rate of gasoline consumption is constant, how much gasoline will the car use on a 35-hour trip?
- The amount of money that a magazine pays for an article varies directly as the number of words in the article. If the magazine pays \$720 for a 1200-word article, how much will be paid for an article of 1500 words?
- The distance traveled by a truck at a constant speed varies directly with the length of time it travels. If the truck travels 168 mi in 4 h, how far will it travel in 7 h?

Solve.

- 13) The number of words typed is directly proportional to the time spent typing. If a typist can type 275 words in 5 min, how long will it take the typist to type a 935-word essay?
- 14) When an electric current is 32 A (amperes), the electromotive force is 288 V (volts). Find the force when the current is 65 A if the force varies directly as the current.
- 15) The area covered by a painter is directly proportional to the number of hours worked. A painter covered 52m² in the first 8 h on the job. How large an area will the painter cover in 24 h?
- 16) A restaurant buys 20 lb of ground beef to prepare 110 servings of chili. At this rate, how many servings can be made with 30 lb of ground beef?
- 17) A mass of 25 g stretches a spring 10 cm. If the distance a spring is stretched is directly proportional to the mass, what mass will stretch the spring 22 cm?
- 18) The amount of chlorine needed for a pool varies directly as the size of the pool. If 5 units of chlorine is the amount needed for 2500 L of water, how much chlorine is needed for 3750 L of water?

Use the Means/Extremes Theorem to state whether each proportion represents a direct variation. Show and label each step of your work.

19) $\frac{x_1}{x_2} = \frac{y_1}{y_2}$

20) $\frac{x_2}{y_1} = \frac{x_1}{y_2}$

21) $\frac{y_1}{x_2} = \frac{y_2}{x_1}$

22) $\frac{y_2}{x_2} = \frac{y_1}{x_1}$

Do all problems 1-22 on a separate sheet of paper. Then include the next sheet with the problems completed in the space provided. Place problems 1-22 in between this page and the page with 23-24. Follow instructions carefully!

Complete all parts of 23 in the space provided.

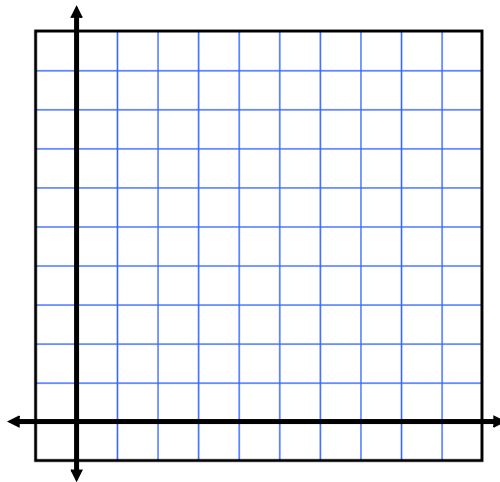
23) The total cost of riding the subway to and from school every day is \$1.50.

- a) Make a table that shows the number of school days (d) and the total cost in dollars (C) for trips to and from school for 1 week.

d					
C					

- b) Write a rule in the form of a direct variation for the data in your chart. Rewrite this rule using a fraction for your constant of variation.

- c) Make a graph from your rule or table. Label all parts of the graph appropriately.



- d) Use your information to find the cost of riding the subway for one month (22 school days). Justify your answer with your equation.

- 24) This problem is to be completed using the program *Numbers*. Print your results and turn them in with your notebook after this page.

The table shows the average number of field goals attempted (f) and the average number of field goals made (m) per game for all NCAA Division 1 women's basketball teams for 9 consecutive seasons.

Field Goals Attempted, f	61.8	61.9	61.8	60.8	59.5	59.0	58.9	59.2	58.4
Field Goals Made, m	25.7	25.6	25.6	25.2	24.5	24.6	24.5	24.3	24.0

- Enter the data into a spreadsheet. Enter the first box in cell B1 and the numbers across through B10. Enter the second row in C1 to C10. Make your chart look neat. Center the numbers and right justify the first columns. You may resize your columns so the chart fits on one page.
- In the space provided, translate the following: The number of field goals made varies directly as the number of field goals attempted.
- In cell D1, make a heading named Constant of Variation k . Use the equation we just made and use numbers in the columns to figure out k for each. To make a formula in *Numbers*, first press = , then click on the first cell for your formula, press / , then click the second cell of your formula, and press the Enter button. Round the answers to the nearest hundredth.
- Estimate what you believe to be the best value of k to represent the direct variation. $k =$ _____.
- Rewrite your equation in part b) using your answer for d). Use this equation to estimate the Field Goals Made if 66.2 were Attempted.
- Give a good reason why we can assume $b = 0$ for our variation.
- Print and submit your spreadsheet. For extra credit, use row B and C to make a bar graph. Make sure all your printing fits on one page (print view).