

Name Key

Date \_\_\_\_\_

## Word problems involving rate of change

- When the dependent variable increases when the independent variable increases, the rate of change is (Positive, negative, zero, undefined) circle one.
- When the dependent variable stays the same as the independent variable increases, the rate of change is (Positive, negative, zero, undefined) circle one.
- When the dependent variable decreases as the independent variable increase, the rate of change is (Positive, negative, zero, undefined) circle one.
- When the dependent variable increase as the independent variable stays the same, the rate of change is (Positive, negative, zero, undefined) circle one.

### Find the rate of change

Hint: word problems are units Identify what you are given and determine the unit and the time.)  
time

Write the ordered pair (time, units).

5.

X	Y
20	35
25	40

$$\frac{\Delta y}{\Delta x} = \frac{5}{5} = 1$$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{40 - 35}{25 - 20} = \frac{5}{5} = 1$$

- A climber is on a hike. After 2 hours he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet. What is the average rate of change?  
 $\frac{300}{4} = 75 \text{ ft/h}$   $y - 400 = 75(x - 2)$   $y = 75x + 250$
- A scuba diver is 30 feet below the surface of the water 10 seconds after he entered the water and 100 feet below the surface after 40 seconds. What is the scuba divers rate of change?  
 $\frac{-70}{30} = \frac{7}{3} \text{ ft/s}$   $y + 30 = -\frac{7}{3}(x - 10)$   $y = -\frac{7}{3}x + \frac{20}{3}$
- A rocket is 1 mile above the earth in 30 seconds and 5 miles above the earth in 2.5 minutes. What is the rockets rate of change in miles per second? What about miles per minute.  
 $2.5 \text{ m} = 150 \text{ s}$   $\frac{4}{120} = \frac{1}{30} \text{ m/s}$   $y - 1 = \frac{1}{30}(x - 30)$   $y = \frac{1}{30}x$
- A teacher weighed 145 lbs in 1986 and weighs 190 lbs in 2007. What was the rate of change in weight?  
 $\frac{45}{21} = \frac{15}{7} \text{ lbs/y}$   $y - 145 = \frac{5}{21}(x - 1986)$   $y = \frac{5}{21}x + 1675$
- Over the last 50 years, the average temperature has increased by 2.5 degrees worldwide (I made this up). What is the rate of change in worldwide temperatures per year?  
 $\frac{2.5}{50} = \frac{1}{20} \approx 0.05 \text{ deg/y}$
- Michael started a savings account with \$300. After 4 weeks, he had \$350 dollars, and after 9 weeks, he had \$400. What is the rate of change of money in his savings account per week?  
 $\frac{50}{5} = 10 \text{ /week}$   $y - 350 = 10(x - 4)$   $y = 10x + 310$
- A plane left Chicago at 8:00 A.M. At 1: P.M., the plane landed in Los Angeles, which is 1500 miles away. What was the average speed of the plane for the trip?  
 $\frac{1500}{5} = 300 \text{ m/h}$
- After 30 baseball games, A-Rod had 25 hits. If after 100 games he had 80 hits, what is his average hits per baseball game.  
 $\frac{55}{70} = \frac{11}{14} \text{ h/g}$   $y - 25 = \frac{11}{14}(x - 30)$   $y = \frac{11}{14}x + \frac{10}{7}$   $y = 0.79x + 1.43$

### Find the slope of a line that has these points

14.  $(8, 2)$  and  $(11, 3)$   $\frac{3 - 2}{11 - 8} = \frac{1}{3}$

15.  $(8, 0)$  and  $(8, 6)$   $\frac{6 - 0}{8 - 8} = \frac{6}{0}$  undefined