

Rates and Ratios Practice

Name _____

Date: / /

A **rate** is a comparison, using division, between two quantities. The quantities have **units** that tell you what type of quantities are involved (e.g., time, weight, cost, volume, etc.). Each quantity is a number with a unit: 3 hours, 5 grams, 1000 dollars. Frequently, the quantity in the denominator is a unit of time. The units for rates are always one-unit *per* another-unit.

Speed is a rate. Its units are *miles per hour* or *meters per second* or any other comparison of a distance unit to a time unit.

A **ratio** is a comparison between two groups. Often, we are comparing how many of each item there are. We can state a ratio in two standard ways. If there are 6 pigs and 14 chickens, we can say the ratio of chickens to pigs is $\frac{14}{6}$ or the ratio of chickens to pigs is 14:6 (read as 14 to 6). We prefer working with fractions because it is easier to carry out operations with them. For example, we can reduce the $\frac{14}{6}$ ratio to $\frac{7}{3}$, which tells us that there are 7 chickens for every 3 pigs. We can also reverse these (by taking the reciprocal) and say, for example, that the ratio of pigs to chickens is $\frac{3}{7}$.

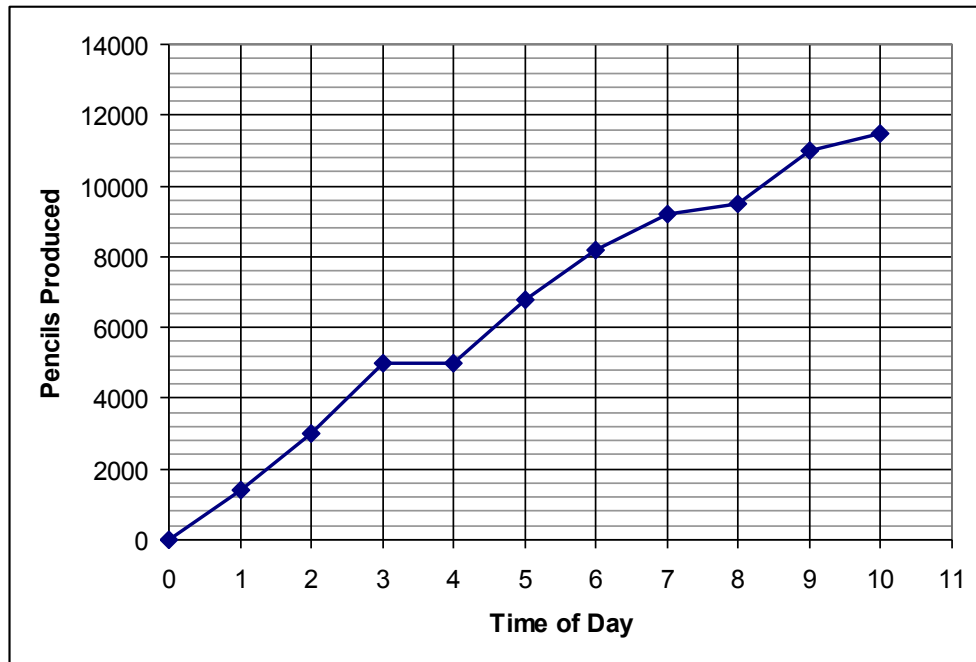
Solve each of the following. Show all steps **neatly**. If you cannot solve a problem, write a sentence explaining where you got stuck, what you did not understand, or what information you needed.

1. If there are 120 people in a room and 50 of them are male, what is the ratio of males to females?

2. The bus this morning had adults and children in a ratio of 3:4 or $\frac{3}{4}$. There were 16 children on the bus. How many adults and how many people in total were on the bus?

3. Maurice ran a race at 13 kilometer per hour (km/hr). How far did he go in the first 3 hours? In the first 12 minutes?

4. The graph below shows how many pencils have been manufactured during the day at a factory.



During what two hour stretch were the most pencils produced?

From _____ to _____.

When was snack time? When was lunch? _____ and _____.

What is the rate at which pencils were being produced from time = 0 to time = 3? (This is the same as speed only for pencil production). Include the proper units for a rate and write down all calculations (even if you use a calculator).

What is the rate at which pencils were being produced from time = 4 to time = 8?

5. Ramilda makes 12 dog houses per week. She has built 430 doghouses. For how long had she been working?

6. In a bag of red and green candies, the ratio of red candies to green candies is 2:3. If the bag contains 120 sweets, how many of each color sweet are there? Show your work/thinking.

7. In the purple book, on page 314, do problem 2.

8. Challenge. Patti's distance from home is given by this formula. $P = t^2$, where t is time in seconds and P is distance in meters.
 - a. What was her average speed during her first second of travel (this is from the start when time = 0 to the end when time = 1).
 - b. What was her average speed for the second second of travel?
 - c. The third?
 - d. Can you predict and test a rule for her average speed in the n^{th} second?