RATIOS – Notes and Homework: DUE ON EXAM

Ratios are not as easy as you think. Be careful in your reading of the problems so that you don't get caught in a trap!

Ratio - a comparison of two quantities.
The ratio of **a to b** may be written as $a : b$ (**odds notation**) or $\frac{a}{b}$ (**fraction notation**)

Proportion – when 2 ratios are equivalent we can write: $\frac{1}{12} = \frac{2}{24}$

Example: There is one faculty member for every 15 students at a college.
Write this ratio in odds notation:

Write this ratio in fraction notation:

There are 675 students. How many faculty members are there?

Example: Inks Lake has a ratio of ducks to geese of **16:9** (for every 16 ducks there are 9 geese),

➤ If there are 192 ducks, how many geese are at the lake?

➤ Suppose there are 400 ducks and geese **total**. How many geese are there?

Note that the total water fowl is 400. What is the total water fowl in our ratio?   16 ducks and 9 geese make a total of 25 birds. We now need to analyze this based on the number of geese out of the number of total birds!!!
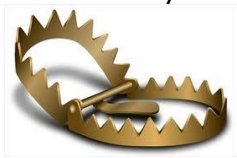
Set up a table

ducks	16	d
geese	9	g
total	25	400

Now here is a real live TAKS Question!

The Hawthorne Mustangs have won 4 games
and lost 6 games this season. Based on these
results, which is the best prediction of the
number of games the Mustangs must play in
order to win 6 games?

F 8

G 9

H 12

J 15

Again here is the trap. If we go about our merry way and don't carefully read this problem here is what we will more than likely do:
win 4 and lose 6 so that is a ratio   we want 6 wins and x; 4 compares to 6 and 6 compares to x, right????

$4:6$

$6:x$ cross multiply: $4x = 6 \cdot 6$

$$4x = 36 \quad \therefore \quad x = 9$$

Think about that answer. Did we use the right ratios to make a proportion?

$$\frac{wins}{losses} = \frac{wins}{losses} \qquad vs. \qquad \frac{wins}{total\ games} = \frac{wins}{total\ games}$$

Set up a table with your data and unknowns:

wins	**4**	**6**
losses	**6**	l
total games	**10**	t

Unit Rate – a form of a ratio in which the two terms have different units. A unit rate is a rate which has a denominator of 1. So a car travelling at a rate of 120 miles in 2 hours has a <u>rate</u> of $\frac{120\ miles}{2\ hours}$ the car has a <u>unit rate</u> of $\frac{60\ miles}{1\ hour}$

Example: Takeru Kobayashi of Japan ate 53.5 hotdogs in 12 minutes to win a contest. Find the unit rate. Round to the nearest hundredth.

Example: Cory earns $52.50 in 7 hours. What is his unit rate?

Conversion factor – a rate in which the 2 quantities are equal but use different units are called conversion factors. $\dfrac{12\ in}{1\ ft}$ $\dfrac{60\ sec}{1\ min}$ $\dfrac{5280\ feet}{1\ mile}$

Example: The dwarf sea horse *Hippocampus zosterae* swims at a rate of 52.68 feet per hour. What is the speed in inches per minute?

Dilation –is a transformation that produces an image that is the same shape as the original, but is a different size. A dilation either stretches or shrinks the original figure. A dilation needs a scale factor.

The scale factor may be presented as a number. To determine the scale factor you must know whether you going from: **big to little** or **little to big**

To shrink we go from big to little. The scale factor will be: $0 < s < 1$; that is, a fraction. To stretch we go from little to big. The scale factor will be: $s > 1$; that is a number greater than 1.

Example: given a rectangle with dimensions of 4 x 6 if it is enlarged by a scale factor of 4. What are the new dimensions?
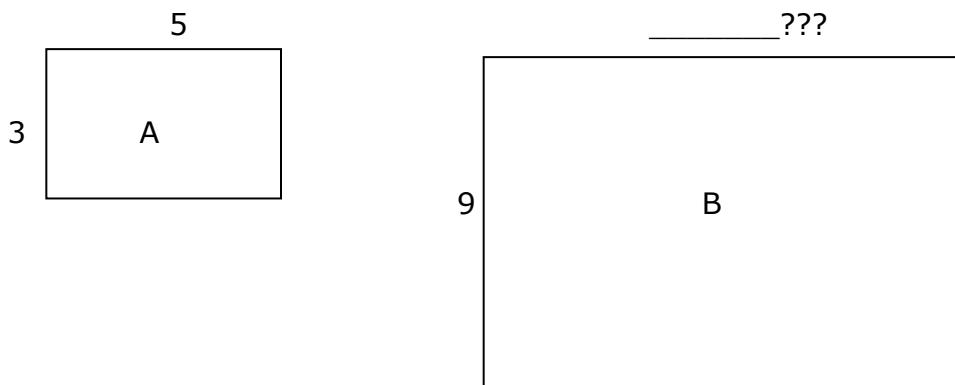
If the scale factor is 0.5, what are the new dimensions?

Example: Think of it as, what do you multiply the first measurement to get the second measurement? $? \times s_1 = s_2$

What is the scale factor from A to B?

What is the scale factor from B to A?

What is the measurement of the missing side?

5

_____???

3   A

9   B

A house plan has a scale factor of 1:12. (1 inch:12 feet) If the plan shows the house width to be 4.5 inches long, How wide in feet is the actual house?
Always write what you are comparing as a proportion, so here: $\dfrac{plan}{actual} = \dfrac{plan}{actual}$

RATIO BASICS HOMEWORK

NAME_____   CLASS PERIOD_____

1. The ratio of freshman to sophomores in a drama club
   is 5:6. There are 18 sophomores in the drama club.
   How many freshmen are there?   _____

Find each unit rate.

2. Four pounds of apples cost $1.96.   3. Sal washed 5 cars in 50 minutes.

_____   _____

4. A giraffe can run 32 miles per hour. What is this
   speed in feet per second? Round your answer
   to the nearest tenth.   _____

Solve each proportion.

5. $\dfrac{y}{4} = \dfrac{10}{8}$ 6. $\dfrac{2}{x} = \dfrac{30}{-6}$ 7. $\dfrac{3}{12} = \dfrac{-24}{m}$

_____   _____   _____

8. $\dfrac{3t}{10} = \dfrac{1}{2}$ 9. $\dfrac{32}{4} = \dfrac{b+4}{3}$ 10. $\dfrac{7}{x} = \dfrac{1}{0.5}$

_____   _____   _____

TAKS:

11. Sam is building a model of an antique car. The scale of his model to the actual car is 1:10. His model is $18\frac{1}{2}$ inches long. How long is the actual car?

_____

12. The scale on a map of Virginia shows that 1 centimeter represents 30 miles. The actual distance from Richmond, VA to Washington, DC is 110 miles. On the map, how many centimeters are between the two cities? Round your answer to the nearest tenth.

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