LESSON # 19 Solving a proportional Situation page 128-129

A **proportion** is an equality between two equivalent ratios or rates.

Several strategies exist for solving problems involving a proportional situation. Here are four of them

Unit Rate

Find the amount for 1 item, then multiply the number by the the numbers of items you need.

$\frac{24.99}{12} = 2.08$ 1 rose?

7 roses? x 7 $= 14.56$

Proportionality Coefficient

The numbers in the second row are obtained by multiplying the numbers of the first row by a number called the **proportionality coefficient**. $\frac{Y}{X}$

X	Y
1	7.5
2	15
3	?

$7.5 \div 1 = 7.5$

$15 \div 2 = 7.5$

$3 \times 7.5 = 22.5$

Change Factor (scale factor)

This method is based on the fact that if both terms of a ratio or rate are multiplied by the same number (except 0), an equivalent ratio or rate is obtained.

$\frac{1}{2} \times 4 = \frac{4}{8}$ (×4)

$\frac{17}{21} \times 3 = \frac{51}{?63}$

Product of the Extremes is = to the Product of the Means (cross multiply and divide).

Multiply the numbers diagonally and divide by the number that is left over.

Lesson 19 continued....

1. The ratio of the number of blue sweaters to the number of red sweaters is 2:3. How many red sweaters are there, if there are 6 blue sweaters?

$$\frac{b}{r} = \frac{2}{3} = \frac{6}{?\ red}$$

$6 \times 3 = 18$

$18 \div 2$

9 red

2. A 150ml tube of toothpaste costs $1.32. How much is this per 100ml?

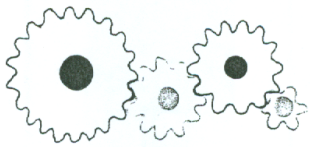
$$\frac{150mL}{\$1.32} = \frac{100mL}{?}$$

$\$.88 | 100mL$

Review of Proportions

Method	Example
÷	$7 \div 9 = .78$
Criss-Cross	$\frac{1}{10} = \frac{2}{20}$ (1×20 = 20, 10×2 = 20)
Reduce	$\frac{1}{10} = \frac{2 \div 2}{20 \div 2} \frac{1}{10}$
Factor of Change (sideways)	$\frac{1 \times 2}{10 \times 2} \frac{2}{20}$ ✓
Common *Denominator*	$\frac{1 \times 2}{10 \times 2} \frac{2}{20}$ $\frac{2}{20} = \frac{2}{20}$ ✓
Unit Rate	\$1.29 for 7 bananas. $\frac{1.29}{7}$ = 1 banana \$.18
"Proportionality of Coefficient" $= \frac{Y}{X}$	X: 1, 2, 3, 4 / Y: 5, 10, 15, 20 — Divide = all 5
Cross Multiply & Divide	7×12, $\frac{7}{10} = \frac{8.4}{12}$

Proportions
Word Problems



1. The ratio of the number of blue sweaters to the number of red sweaters is 2: 3. How many red sweaters are there, if there are 6 blue sweaters?

_____

2. The ratio of Shauna's Math mark to her English mark is $\frac{3}{5}$. What is her math mark, if her English mark is 50?

_____

3. The ratio of the number of fish to the number of plants in an aquarium is 1 : 3.
   (a) If there are 12 plants, how many fish are there? _____
   (b) If there are 2 fish, how many plants are there? _____

4. Boston outshot Montreal 5 : 3. If Boston had 15 shots, how many shots did Montreal have?

_____

5. The ratio of girls to boys at a swim meet was $\frac{1}{2}$. How many girls were there if there were 60 boys?

_____

6. If Paul rode his bike at a rate of 11 kilometres per hour (11 km/h), how far would he ride in 5 h at the same rate?

_____

7. A 150-mL tube of toothpaste costs $1.32. How much is this per 100 mL?

_____

8. A 350-mL bottle of shampoo costs $2.17. What is the cost per 100 mL?

_____

Name:_____ Date:_____

Math 200- _____
Proportions Assignment

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1 Lesley travels 507 km in 6.5 h. How far will she travel in 1 h?

2 Michael travels at 85 km/h for 2.5 h. How far has he travelled?

3 Alan travelled 30 km at 50 km/h. How long did the trip take?

4 At a speed of 750 km/h, how long would it take to fly 1875 km?

5 A jet travels 4250 km at 850 km/h. How long will the plane be in the air?

6 A plane travels 4 h 20 min at 800 km/h. How far has it flown?

7 Christie earns $5.70/h. How much does she earn in 34 h?

8 Jason earns $5.25/h. If his salary is $136.50, how many hours has he worked?

9 Sharon earns $199.80 for 37 h of work. What is her hourly rate?

10 Frank cleans fish at the rate of two fish per minute. How long will it take to clean 27 fish?

11 Lynne can type 120 words in 4 min. At that rate, how long will she take to type a 3000-word essay?

12 Bruce jogs at the rate of 120 m/min. How long will it take him to jog 3 km?

13 Rosemary rides her bicycle at 9.5 km/h. How far will she travel in 40 min?

14 A loose connection loses water at the rate of 0.7 L/min. If 105 L of water were collected from the connection, how many hours was the water running?

15 A model airplane uses 0.2 L of fuel every 45 min. If the total amount of fuel used was 2.4 L, how many hours was the plane running?