

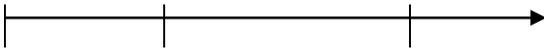
Four Methods to Solve Proportions

Problem:

Apples are on sale for 2 lbs for \$3. How many pounds can you buy for \$30?

Question 1: Is this a proportional situation? Why or why not?

Method I: Draw a *double-sided number line*, label the parts, set up a proportion and solve.



Method II: Using any method, calculate *unit rate* and then calculate how many pounds you can get for \$30.

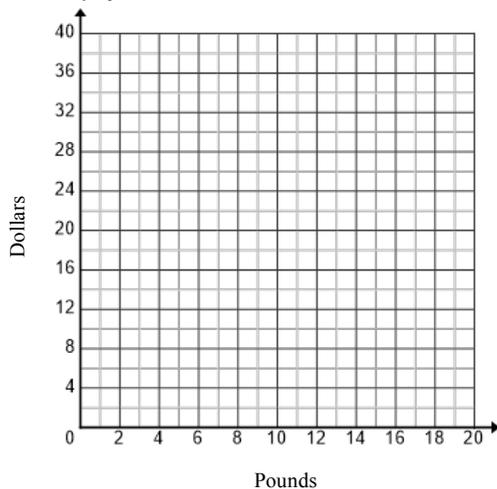
Unit Rate:

How many pounds for \$30:

Method III: Graph a point to represent the original ratio. How many pounds can you buy for \$0? Record this additional point on the graph and connect the two points. Extend the line to predict how many pounds you can buy for \$30.

What is the slope of this line?

How many pounds for \$30?



Method IV: Using the constant of proportionality (unit rate), write an equation to represent the original ratio (use d to represent number of dollars and p to represent number of pounds). Use this equation to calculate how many pounds for \$30.

Equation:

How many pounds for \$30:

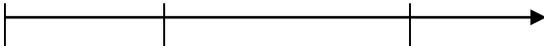


Problem:

Mary runs 5 km in 75 minutes. How long will it take her to run 2 km?

Question 2: Is this situation proportional? Why or why not?

Method I: Draw a *double-sided number line*, label the parts, set up a proportion and solve.



Method II: Using any method, calculate *unit rate* and then calculate how long it will take her to run 2 km.

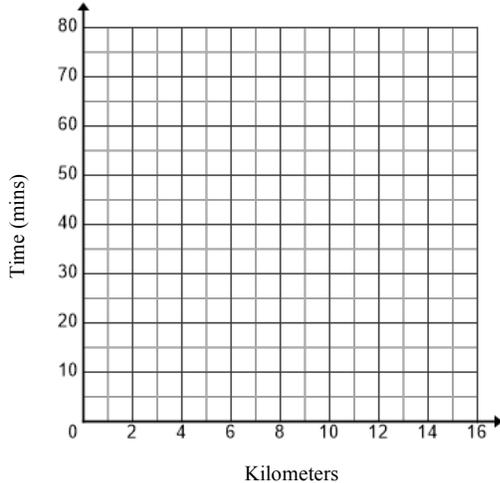
Unit Rate:

How long to run 2 km:

Method III: Graph a point to represent the original ratio. How far did she run in 0 minutes? Record this additional point on the graph and connect the two points. Extend the line to predict how long it will take to run 2 km.

What is the slope of this line?

How long will it take to run 2 km?



Method IV: Using the constant of proportionality (unit rate), write an equation to represent the original ratio (use d to represent distance and t to represent time). Use this equation to calculate how long it will take her to run 2km.

Equation:

How long will it take to run 2 km?



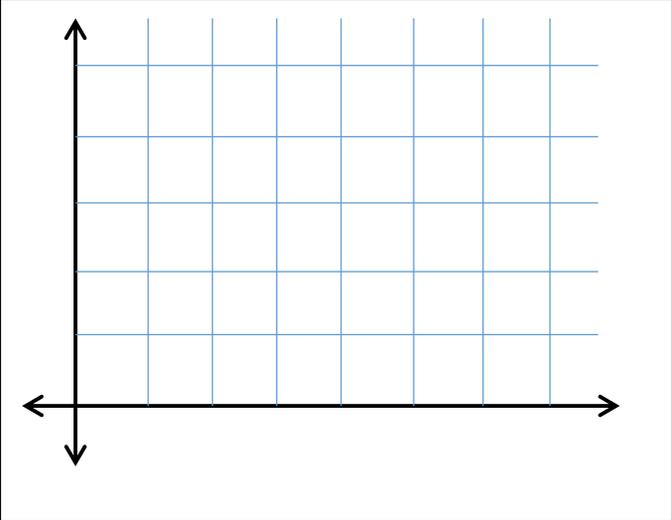
Unit Rate

Situation/Question #3
 A recipe calls for $\frac{1}{2}$ cup of tomatoes for every $\frac{1}{8}$ cup of jalapenos. If you accidentally poured in $1\frac{1}{2}$ cups of tomatoes, how many cups of jalapenos should you use in total?

Table

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Other/Equation



Proportion

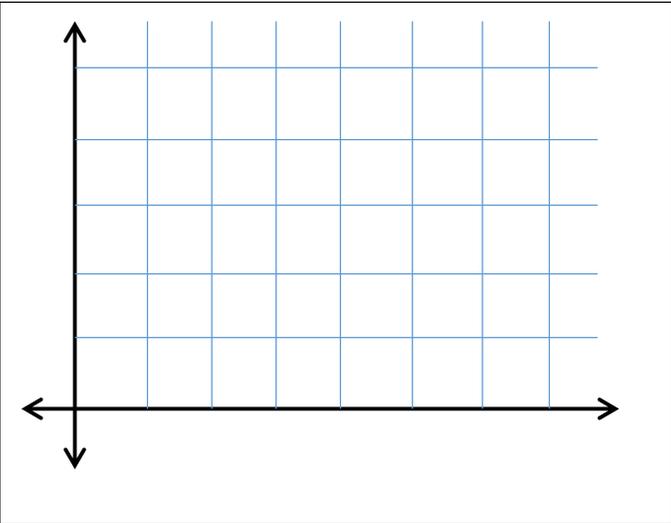
Unit Rate

Situation/Question #4

Table

RED	BLUE
2	3
4	6
10	_____
_____	_____

Other/Equation



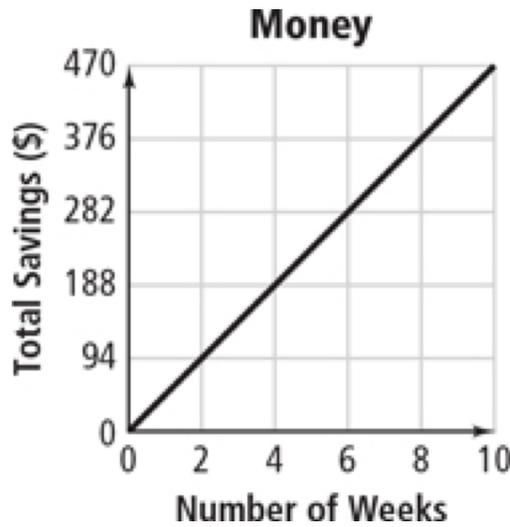
Proportion

Unit Rate

Situation/Question #5

Table

Other/Equation



Proportion

Unit Rate

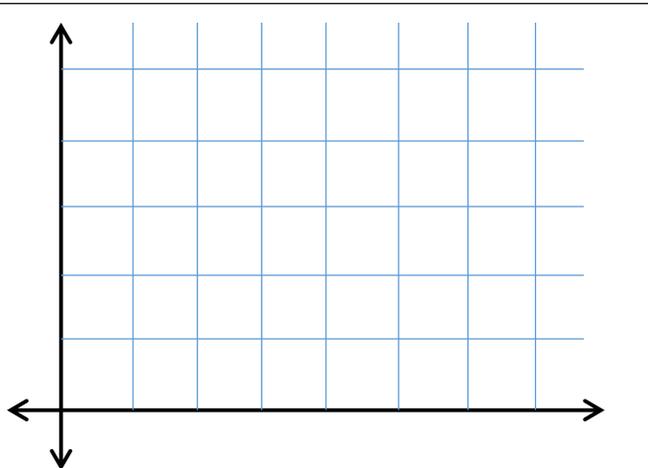
Situation/Question #6

Table

Other/Equation



24 s for \$14.99
or
6 for \$3.99



Proportion



Name: _____ Date: _____ Period: _____

Comparing Methods

1. Which of the four methods is easiest for you? Why?

2. What are the benefits to using each method?



Teacher Directions - 4 Methods to Solve Proportions

Materials

- Rulers
- Calculators (optional)

Objective

Students will compare and contrast methods to use to solve problems involving proportional relationships.

Directions

Put students in groups of 4, and ask them to discuss with their group the methods they have learned to solve problems involving proportional relationships. After a few minutes, randomly select students to share a method and write it on the board. Announce to the students that today they will be practicing with the following:

- Double-Sided Number Line
- Unit Rate
- Graphing
- Writing an Equation

Use Round Robin to have students share with their group members their favorite method from the list and why. Pass out the materials as students are sharing with their group. After passing out the materials, have students number themselves off from 1-4. Then use Numbered Heads by randomly selecting a number and a group to share. Instruct students that they are going to solve problems 1-3 as a group, but each student is only responsible for one method, the same number that they chose. Let students know that it is also okay to trade roles if they favor one method over the others.

Problems 1 & 2

Let the students know that they have 3 minutes to solve Problem #1 using the method that they were assigned. When the 3 minutes are up, the members will share and discuss their method/solution with each other. Each person is also responsible for recording the work for all methods. When all groups have finished sharing with each other, randomly select a table to share the solution at the document camera.

Then give the students 5 minutes to complete Problem #2. Walk around to monitor student progress and to remind students that they are discussing how they solved each problem.

Problems 3-6

In these problems, students are given one piece of information and must complete or solve all the other methods for the same situation. In some problems, students will need to create the situation and/or question for themselves, so their answers will differ.



ANSWER KEY

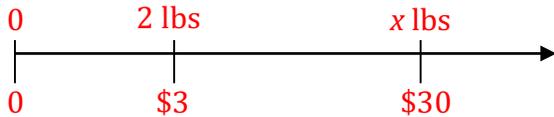
Problem: Apples are on sale for 2 lbs for \$3. How many pounds can you buy for \$30?

Question 1: Are these data proportional or not proportional? Why or why not?

Yes, the data are proportional because the ratio between pounds and the cost is constant.

Method I: Draw a *double-sided number line*, label the parts, set up a proportion and solve.

Pounds



$$\frac{2}{3} = \frac{x}{30}$$

$$60 = 3x \text{ by cross products}$$

$$20 = x$$

Method II: Using any method, calculate *unit rate* and then calculate how many pounds you can get for \$30.

Unit Rate (how much for 1 pound):

$$\frac{\$3}{2 \text{ lbs}} = \frac{\$1.50}{1 \text{ lb}} \quad \$1.50/\text{lb}$$

How many pounds for \$30:

$$\frac{\$1.50}{1 \text{ lb}} = \frac{\$30}{x \text{ lbs}}$$

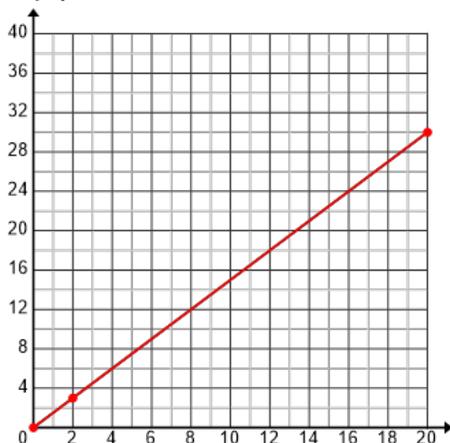
$$1.50x = \$30$$

$$x = 20$$

Method III: Graph a point to represent the original ratio. How many pounds can you buy for \$0? Record this additional point on the graph and connect the two points. Extend the line to predict how many pounds you can buy for \$30.

What is the slope of this line? $\frac{3}{2}$

How many pounds for \$30? **20 lbs**



Method IV: Using the constant of proportionality (unit rate), write an equation to represent the original ratio (use d to represent dollars and p to represent pounds). Use this equation to calculate how many pounds for \$30.

$$\text{Equation: } d = 1.50p$$

How many pounds for \$30:

$$30 = 1.50p$$

$$20 = p$$

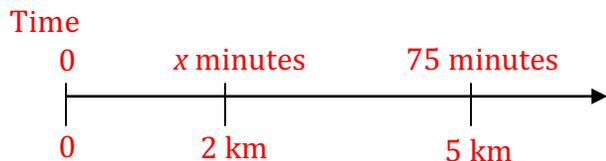


Problem: Mary runs 5 km in 75 minutes. How long will it take her to run 2 km?

Question 2: Are these data proportional or not proportional? Why or why not?

Yes, they are proportional.

Method I: Draw a *double-sided number line*, label the parts, set up a proportion and solve.



Distance

$$\frac{x \text{ mins}}{2 \text{ km}} = \frac{75 \text{ mins}}{5 \text{ km}}$$

$$5x = 150$$

$$x = 30$$

Method II: Using any method, calculate *unit rate* and then calculate how long it will take her to run 2 km.

Unit Rate (how long for 1 km):

$$\frac{75 \text{ mins}}{5 \text{ km}} = \frac{15 \text{ mins}}{1 \text{ km}} \quad 15 \text{ min/km}$$

How long to run 2 km:

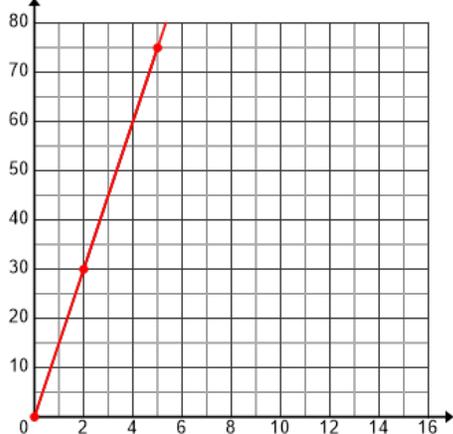
$$\frac{15 \text{ mins}}{1 \text{ km}} = \frac{x \text{ mins}}{2 \text{ km}}$$

30 mins

Method III: Graph a point to represent the original ratio. How far did she run in 0 minutes? Record this additional point on the graph and connect the two points. Extend the line to predict how long it will take to run 2 km.

What is the slope of this line? 15

How long will it take to run 2 km?



30 mins

Method IV: Using the constant of proportionality (unit rate), write an equation to represent the original ratio (use d to represent distance and t to represent time). Use this equation to calculate how long it will take her to run 2 km.

Equation: $t = 15d$

How long will it take to run 2 km?

$$t = 15(2)$$

$$t = 30$$



Unit Rate

$$\frac{\frac{1}{8}}{\frac{1}{2}} = \frac{\frac{2}{8}}{1}$$

The recipe needs $\frac{2}{8}$ of a cup for every 1 cup of tomatoes, so it will need $\frac{3}{8}$ for 1 and $\frac{1}{2}$ cups.

Situation/Question #3

A recipe calls for $\frac{1}{2}$ cup of tomatoes for every $\frac{1}{8}$ cup of jalapenos. If you accidentally poured in 1 and $\frac{1}{2}$ cups of tomatoes, how many cups of jalapenos should you use in total?

Table

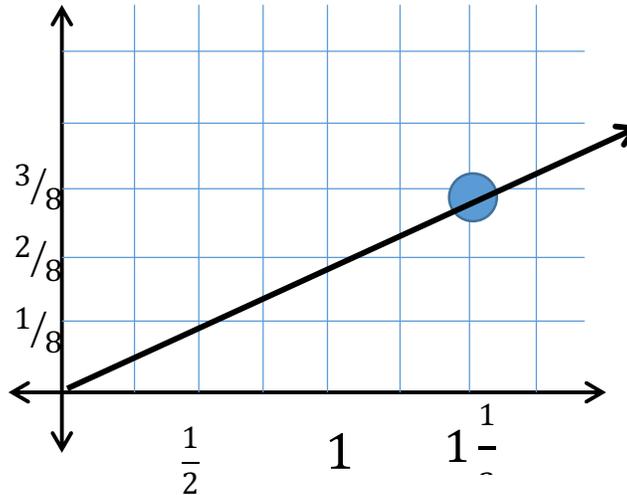
Tomatoes	Jalapenos
$\frac{1}{2}$	$\frac{1}{8}$
1	$\frac{2}{8}$
$1 \frac{1}{2}$	$\frac{3}{8}$

Other/Equation

$$4j = t$$

or

$$\frac{1}{4}t = j$$



Proportion

$$\frac{\frac{1}{2}}{\frac{3}{2}} = \frac{\frac{1}{8}}{x}$$

Questions 4 & 5 will vary depending on the student's choice of question to investigate.

Question 6: the 24 pack is a slightly better deal as the Gatorades are \$0.625 each and the 6 pack are \$0.66 each.

