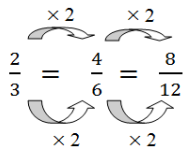


# Concept: Ratios and Proportions

Name: \_\_\_\_\_

## Warm-Up:





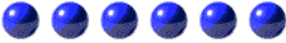

Fill the following charts creating equivalent fractions



**Remember:** What you do to the top of the fraction, you must also do to the bottom of the fraction.

$\frac{4}{5} = \frac{8}{10} = \frac{12}{15}$	$\frac{6}{8} = \frac{12}{16} = \frac{18}{24}$	$\frac{3}{9} = \frac{6}{18} = \frac{9}{27}$
$\frac{24}{35} = \frac{48}{70} = \frac{72}{105}$	$\frac{11}{20} = \frac{22}{40} = \frac{33}{60}$	$\frac{2}{7} = \frac{4}{14} = \frac{6}{21}$

## Compare:

Pictures		Words / Numbers	
	to		blue squares to yellow squares
<input type="text" value="6"/>	to	<input type="text" value="2"/>	
	to		cups of blueberries to spoons
<input type="text" value="4"/>	to	<input type="text" value="2"/>	
	to		balls to triangles
<input type="text" value="6"/>	to	<input type="text" value="5"/>	

**Group Activity:**

To demonstrate prior knowledge and understanding of ratios and proportions, arrange the following ratio and proportion words, phrases, numbers, and concepts into groups and explain why you have grouped them the way you did.

$\frac{2}{3}$	rate	equivalent	1 to 3
order	type of unit	comparison	proportion
Sizing	relative size	related to	unit of measure
ratio	equal	number of heart beat per minute	twice as big

*(Responses will vary)*

**Whole Class Activity:**

Have students present their groupings and as a class discuss grouping reasons. Throughout this section review groupings and have students make changes as concepts about ratios and proportions are clarified.

## COMPUTER COMPONENT

**Instructions:** In UMATH X follow the **Content Menu** path:

**Percent > Ratios and Proportions**

Work through all Sub Lessons of the following Lessons **in order**:

- *Ratios in the News*
- *Ratio, Tape Diagram*
- *Writing Ratios*
- *Rate and Unit Rate*
- *What is a Proportion*
- *Proportion with Pattern Blocks*
- *Proportions*
- *Ratio Table*
- *Ratios and Your Body*



As you work through the computer exercises, you will be prompted to make notes in your notebook/math journal.

**NOTES:**

Fill in the blanks with the following words (order, different, rates, equivalent, proportion, comparison, ratio, compares, simplified, units.) *You may need to use some words more than once.*

- (a) A **ratio** is a comparison of one **number** with another number.
- (b) **Rates** should always be **simplified**.
- (c) A **ratio** works with **equivalent** fractions.
- (d) The **order** you write the **ratio** is important.
- (e) When dealing with a one must always use the same **units**.
- e) A rate **compares** quantities with **different** types of measurements.

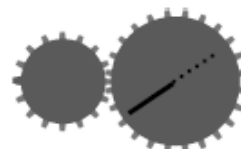
A **ratio** is a **comparison** of **different** quantities that have the same type of units. If we want to write the ratio of boys to girls in the room, we have three different ways to express it.

1. **Boys to Girls**
2.  $\frac{\text{Boys}}{\text{Girls}}$
3. **Boys: Girls**

Sample:

$$\text{Gear Ratio} = \frac{\text{number of teeth on the small gear (drive gear)}}{\text{number of teeth on the large gear (driven gear)}}$$

$$= \frac{24}{16} = \frac{3}{2} \quad \text{OR} \quad \mathbf{24 \text{ to } 16} \quad \text{OR} \quad \mathbf{24:16}$$



A **rate** is a special kind of **ratio**. It **compares** two quantities with **different** types of **measurement**.

*Are all rates ratios and are all ratios rates?*

*Every rate is a ratio. Every ratio is not a rate.*

A **unit rate** is a type of **rate** in which the second term is **1**. This involves **simplifying** the fraction.

Example:      120 miles in two hours

60 miles in **1** hour

A **proportion** is a statement that **2** ratios are **equal**.

Example:       $\frac{4}{5} = \frac{16}{20}$

$$4 : 5 = 16 : 20$$

## OFF COMPUTER EXERCISES

1. Indicate whether the following are rates, ratios or proportions.

- (b) Seven parrots to two cats **ratio**

- (c) Six people per room **rate**
- (d) A dollar (US) is worth \$1.21 (CDN) **rate**
- (e) If a room holds 42 people then 3 rooms will hold 138 people **proportion**
- (f)  $\frac{6}{15} = \frac{4}{10}$  **proportion**
- (g) A camp has 5 campers per counselor **ratio**

2. Complete the following:

- (a) A **ratio** is a comparison between two or more like quantities.
- (b) A **rate** is a comparison between two quantities with different units.
- (c) A **proportion** is an equality between two equivalent ratios or rates.

3. Look at the following items and write the ratios of:

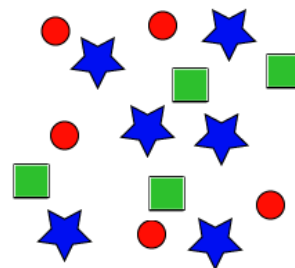
(a) Red circles to green squares- 4 to 4= 1 to 1

(b) Green squares to red circles- 4 to 5

(c) Green squares to blue stars- 4 to 6= 2 to 3

(d) Red circles to green squares to blue stars- 5 to 4 to 6

(e) Blue stars to purple triangles- there are no purple triangles= 6 to 0



*Interesting fact:*

*Archaeologists use ratios when calculating the carbon dating of woolly mammoth's skeletons.*

4. Solve these problems.

(a) Find each person's hourly rate of pay. (dollars per one hour)

i. Rahia earns \$40 for 5 hours of works.

$$\$40 \div 5 = \$8/\text{hr}$$

ii. Shella earns \$39 for 3 hours of work.

$$\$39 \div 3 = \$13/\text{hr}$$

(b) Tilly is thirsty and wants a pop. Store A sells the pop for 1.25 liters for \$2.50. Store B sells the pop for 0.75 liters for \$1.35. *Where can Tilly find the best deal?*

- Justify your answers
- Solve it in at least two different ways.

*To find out the best deal, I will need to establish the unit rate (cost per liter)*

$$\text{Store A- } \$2.50 \div 1.25 = \$ 2.00/\text{liter}$$

$$\text{Store B- } \$1.35 \div 0.75 = \$ 1.80/\text{liter}$$

*The best value may be found at Store B, as it only costs \$1.80/liter*

Interesting fact: 25 % of all cookies baked in the United States are chocolate chip cookies.

(c) A chocolate chip-lover's ratio of chips to cookie requires 324 chocolate chips per batch of cookie dough. *If the recipe makes 24 cookies, how many chocolate chips are in each cookie?*

$$\frac{324}{24} \div 24 = \frac{13.5}{1}$$

*There will be approximately 14 chocolate chips in each cookie.*



(d) Rob drove 654 Km in 6 hours. If we assume that Rob was travelling at constant speed,

i. *How far had Rob driven after 2 hours?*

$$\frac{654}{6} \div 3 = \frac{218}{2} \quad \text{Rob drove 218 km after 2 hours.}$$

ii. *How far could Rob drive in 8 hours?*

$$654 \quad /6 \text{ hr} + 218 \text{ km}/2 \text{ hr} = 872 \text{ km in 8 hours}$$

(e) Using your math class as the sample population, determine the number of students in your class that download music videos at least twice a week. Use this information to estimate the number of students in the school who download music videos at least two nights a week. *Do you think that this sample is appropriate for predicting the viewing habits of all teenagers throughout the country? Explain your reasoning.*

*(Answers will vary)*

### A Second Look!

To demonstrate knowledge and understanding of ratios and proportions, arrange the following ratio and proportion words, phrases, numbers, and concepts into groups and explain why you have grouped them the way you did.

2/3	rate	equivalent	1 to 3
order	type of unit	comparison	proportion
sizing	relative size	related to	unit of measure
ratio	equal	number of heart beat per minute	twice as big

*(Responses will vary)*

## SAMPLE

Rate	Ratio	Proportion
2/3 order sizing type of unit related to 1 to 3 unit of measure	2/3 type of unit related to number of beats per minute unit of measure	sizing relative size equal equivalent twice as big

*Note to teachers:*

*This activity can be used as an assessment of student understanding of the big ideas around ratios and proportions.*