

# Math 7 - Unit 3

## Day 5 - Proportional and Nonproportional Relationships

### Lesson Objectives:

- I can recognize and represent proportional relationships between quantities.
- I can determine whether quantities are proportional by using tables and visual models.
- I can identify the constant of proportionality in tables and visual models of proportional relationships.

Ms. Cochran is planning a year-end pizza party for her students. Ace Pizza offers free delivery and charges \$8 per medium pizza.



Complete the table to determine the cost for different numbers of pizzas ordered.

Cost (\$)	8	16	24	32	40
Pizza	1	2	3	4	5

For each number of pizzas, fill in the boxes to write the relationship of the cost and number of pizzas as a ratio in simplest form.

$$\frac{16}{2} = \frac{8}{1} \quad \frac{24}{3} = \frac{8}{1} \quad \frac{32}{4} = \frac{8}{1} \quad \frac{40}{5} = \frac{8}{1}$$

What do you notice about the simplified ratios?

Two quantities are **proportional** if they have a constant ratio or unit rate. For relationships in which this ratio is not constant, the two quantities are **nonproportional**.

Andrew earns \$18 per hour for mowing lawns. Is the amount of money he earns proportional to the number of hours he spends mowing? Explain. *Yes, because there is a constant ratio of \$18.*

\*Hint\*

\$ earned	18	36	54	72
# of hours	1	2	3	4

$$\frac{18}{1} = \frac{36}{2} = \frac{54}{3} = \frac{72}{4} = \frac{18}{1}$$

A cleaning service charges \$45 for the first hour and \$30 for each additional hour. Is the fee proportional to the number of hours worked?

\*Hint\*

*No, because we don't have a constant unit rate.*

fee \$	45	75	105	135
# hours worked	1	2	3	4

$$\frac{45}{1} \quad \frac{75}{2} = \frac{37.5}{1} \quad \frac{105}{3} = \frac{35}{1} \quad \frac{135}{4} = \frac{33.75}{1}$$

You can use the recipe shown to make a fruit punch. Is the amount of sugar used proportional to the amount of mix used? Yes, because the unit ratios are all 1/2.

\*Hint\*

**Fruit Punch**

1/2 cup sugar  
1 envelope of mix  
2 quarts of water

Sugar (c)	1/2	1	1 1/2	2 1/2	5
Envelope of mix	1	2	3	5	10

$$\frac{1/2}{1} = \frac{0.5}{1} \quad \frac{1}{2} = \frac{0.5}{1} \quad \frac{1 1/2}{3} = \frac{0.5}{1} \quad \frac{2 1/2}{5} = \frac{0.5}{1} \quad \frac{5}{10} = \frac{0.5}{1}$$

The tables shown represent the number of words Emilio and Walter typed over time in their Keyboard classes. Which situation represents a proportional relationship between the time spent typing and the number of words typed? Explain.

Words Emilio Typed	20	40	60
Time (s)	30	60	90

$$.6 \quad .6 \quad .6$$

Proportional

Words Walter Typed	25	60	80
Time (s)	30	60	90

$$.83 \quad 1 \quad .88$$

Nonproportional

The students in Ms. Baca's art class were mixing yellow and blue paint. She told them that two mixtures will be the same shade of green if the blue and yellow paint are in the same ratio.

The table below shows the different mixtures of paint that the students made.

Student	A	B	C	D	E
Yellow	1 part	2 parts	3 parts	4 parts	5 parts
Blue	2 parts	3 parts	6 parts	6 parts	9 parts

How many different shades of paint did the students make?

Some of the shades of paint were bluer than others. Which mixture(s) were the bluest? Explain how you know.

## Homework

Identifying Proportional Relationships WKS

**\* Individual Think Time \***



What to do if you get stuck...

1. Reread the problem. Did you write it down correctly?
2. Reread your notes. Is there a problem similar that we did together in class?
3. Find a problem similar in your book. Try this one to see if it helps.
4. Skip the problem until the end of Individual Think Time. Then ask an "educated" question of a neighbor or Mrs. Call.

Today we're working by...

