PROPORTIONAL TABLE

7th Grade - Math

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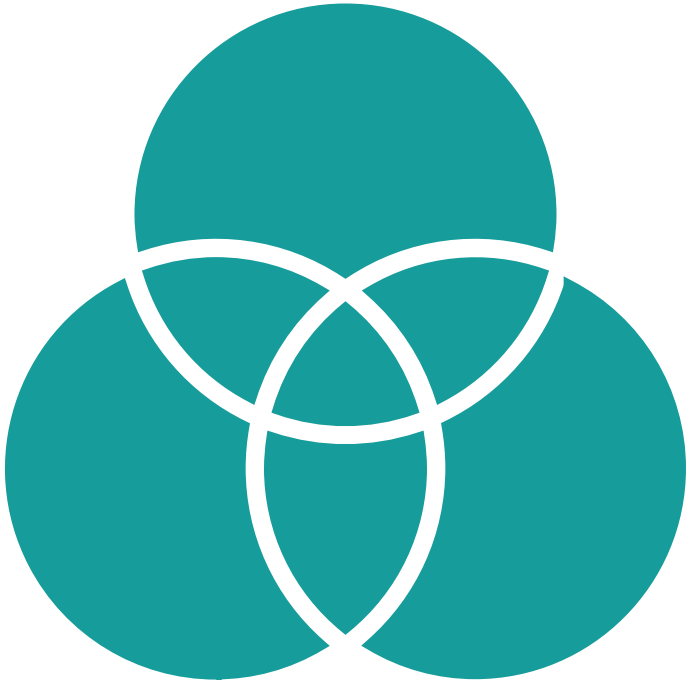
Objectives

- Comprehend that the phrase “proportional relationship” refers to when two quantities are related by multiplying by a “constant of proportionality.”
- Describe relationships between rows or between columns in a table that represents a proportional relationship.
- Explain ow to calculate missing values in a table that represents a proportional relationship.

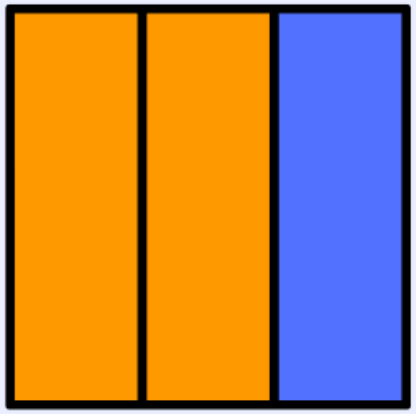


Ratio

- A ratio compares two quantities, and a proportion indicates that the relationship between those quantities is the same in both ratios.

A ratio is a relation that compares two numbers or quantities.

You can compare two parts to each other or to the whole.

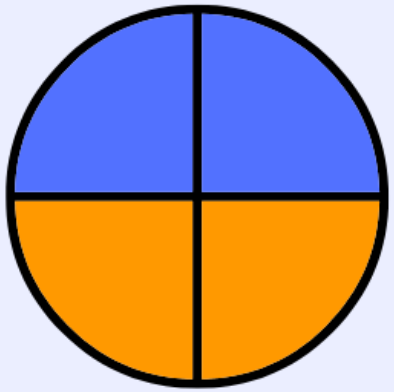


2:1	1:2	2:3	1:3
2/1	1/2	2/3	1/3
2 to 1	1 to 2	2 to 3	1 to 3

Proportion

- A proportion is an equation that states two ratios are equal.

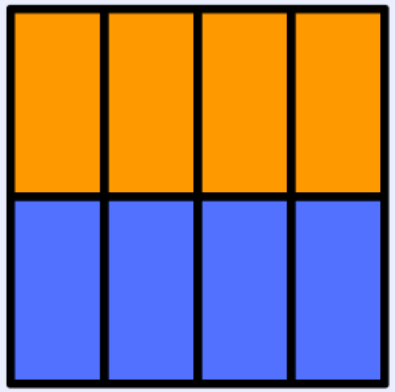
A proportion is a statement or equation that equates two ratios.



2:2 = 4:4

2:2 :: 4:4

2 is to 2 as 4 is to 4



Key Concept

- **Ratio:** A comparison of two quantities, often written as a fraction or with a colon (e.g., 2:5 or 2/5).
- **Proportion:** An equation that shows two ratios are equal, like 2/5 = 4/10.
- **Terms of a proportion:** In a proportion a : b : : c : d (or a/b = c/d), the terms are a, b, c, and d.
- **Extremes:** The first and last terms in a proportion (a and d).
- **Means:** The middle two terms in a proportion (b and c).

How to Check for a Proportion

- You can determine if two ratios form a proportion by checking if the cross-products are equal.
    - *For the proportion a : b : : c : d, the cross-product is found by multiplying the means (b × c) and the extremes (a × d). If a × d = b × c, then the proportion is true.*

Proportional Relationship

- A **proportional relationship** is a connection between two variables where their ratio remains constant, meaning one variable is always a multiple of the other by the same factor, known as the constant of proportionality (k).

PACMAN RACE

Pacman traveled 18 feet every 6 seconds.

Pacman's distance traveled is proportional to time.

Constant of Proportionality

$k =$ _____

Time (*seconds*)	Distance (*feet*)
0	
1	
2	
3	
4	
5	
6	18

Are these tables proportional?

x	y
3	12
5	20
8	32
10	40

Time (*hours*)	Snowfall (*inches*)
2	8
2.5	10
4	12
6	18

x	0	2	4
y	0	5	10

These tables are proportional. Find *k* and the missing values.

x	*y*
3	12
6	24
9	
	40

Gas (*gallons*)	Distance (*miles*)
2	36
2.5	
5	90
6	108

Use the verbal statement to fill in the table. Find the constant of proportionality, *k*.

1. Teri pays 4 dollars for 2 gallons of milk.

Milk (*gallons*)	Cost (*dollars*)
0	
1	
2	
3	
4	

$k =$ _____

2. Patrick eats 15 crabby patties every 3 hours.

Time (*hours*)	Patties (#)
0	
1	
2	
3	
4	

$k =$ _____

In each table, determine if *y* is proportional to *x*. Explain why or why not.

3.

x	*y*
3	12
5	20
8	32
10	40

Proportional? YES or NO

Explanation:

4.

x	*y*
4	2
6	3
10	5

Proportional? YES or NO

Explanation:

5.

x	*y*
1	4
4	8
6	24
9	18

Proportional? YES or NO

Explanation:

6.

x	12	18	15	9
y	4	6	5	3

Proportional? YES or NO

Explanation:

7.

x	0	2	4
y	0	5	10

Proportional? YES or NO

Explanation:

8.

x	0	1	2	3
y	3	5	7	9

Proportional? YES or NO

Explanation:

Use the tables to answer the following.

9.

Candy (*pounds*)	**Cost** (*dollars*)
6	12
3	5
7	14
2	4

Is the cost proportional to the amount of candy?

Why or why not?

10.

Time (*hours*)	**Snowfall** (*inches*)
2	8
2.5	10
4	12
6	18

Is the snowfall proportional to the time?

Why or why not?

11.

Coffee (*ounces*)	6	8	14
Price (*dollars*)	2.10	2.80	4.90

Is the price proportional to the amount of coffee?

Why or why not?

In the following tables y is proportional to x. Fill in the table and state the constant of proportionality.

12.

x	y
2	8
5	20
	40
12	

$k =$ _____

13.

x	y
8	4
6	3
	5
14	

$k =$ _____

14.

x	20	4	8	
y	15		6	9

$k =$ _____

Fill in the table and answer the questions.

15. The number of teachers at Generic Middle School is proportional to the number of students.

Teachers	Students
2	
	80
4	64
9	

a. How many students are there for one teacher?

b. If there are 14 teachers at Generic Middle School, how many students are there?

1. Determine if y is proportional to x. Explain why or why not.

x	4	12	28	36
y	1	4	7	9

Proportional? YES or NO

Explanation:

2. In the table y is proportional to x. Fill in the table and state the constant of proportionality.

x	y
4	12
2	
6	18
	24

$k =$ _____

3. The amount of sugar in lemonade is proportional to the number of glasses.

Glasses (#)	Sugar (*grams*)
2	
	60
4	48
9	
5.5	

a. Find the constant of proportionality. What does it mean in this situation?

b. Fill in the missing values on the table.

c. If there are 177 grams of sugar, how many glasses are there?

EXIT TICKET –

Neptune loves to swim. He swims 9 laps in 2 minutes.

Which table represents Neptune?

A

Time (*minutes*)	Laps (#)
0	0
9	2
18	4
27	6

B

Time (*minutes*)	Laps (#)
0	4.5
2	9
4	18
6	27

C

Time (*minutes*)	Laps (#)
0	0
2	9
4	18
6	27

D

Time (*minutes*)	Laps (#)
4.5	0
9	2
18	4
27	6