

# Module 2—T1L1---Post Secondary Proportions

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Per. A B C D E F

Warm-up: Solve each proportion	$\frac{7}{16} = \frac{x}{48}$	$\frac{10}{p} = 1$	$250 = \frac{1000}{q}$
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**Characteristics of Proportional Relationships**

**Proportional relationships are always:**

- Linear (straight line/have a constant rate of change)
- Passes through the origin (0,0)
- The equation of a proportional relationship is  $y=kx$  where k represents the **constant of proportionality**.  
*k = constant of proportionality*

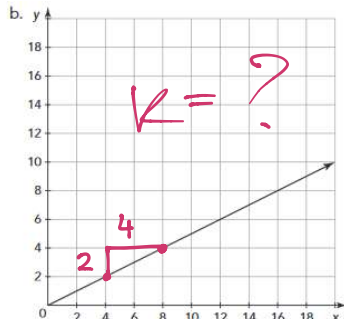
**How to Find the Constant of Proportionality (k)**

GRAPH

- Choose 2 points from the line.
- Find the  $\frac{y}{x} = \frac{\text{how much up or down}}{\text{how much right or left}}$
- Simplify if possible.

*CAUTION: Make sure to read intervals appropriately*

$y = 5x$   
 $\uparrow \frac{2 \div 2}{4 \div 2} = \frac{1}{2}$



EQUATIONS  $y=kx$

The number is front of the x

$y = \frac{4}{5}x$   
 $y = kx \rightarrow k = \frac{4}{5}$

TABLES

The ratio  $\frac{y}{x}$  is the same for all points  
 (don't forget to simplify)

$k = \frac{y}{x}$

Number of Hours	Number of portraits painted
x	y
1	5 = $\frac{5}{1}$
2	10 = $\frac{10}{2} = \frac{5}{1}$
6	30 = $\frac{30}{6} = \frac{5}{1}$
9	45 = $\frac{45}{9} = \frac{5}{1}$

$k = \frac{5}{1}$

# Module 2—T1L1---Post Secondary Proportions

Are these Proportional Relationships?		$y = \frac{4}{5}x + 3$ $y = kx$	$\frac{y}{x} = \frac{6 \div 2}{4 \div 2} = \frac{3}{2}$ <table border="1"> <tr><th>X</th><th>Y</th></tr> <tr><td>4</td><td>6</td></tr> <tr><td>6</td><td>9</td></tr> <tr><td>10</td><td>15</td></tr> </table> $\frac{9}{6} = \frac{3}{2}$ $\frac{15}{10} = \frac{3}{2}$	X	Y	4	6	6	9	10	15		$y = 3x$ $y = kx$
	X	Y											
	4	6											
	6	9											
	10	15											
Proportional: Yes <u>No</u>	Proportional: Yes <u>No</u>	Proportional: <u>Yes</u> No	Proportional: <u>Yes</u> No	Proportional: <u>Yes</u> No									
Why? <u>Does not go through (0,0)</u>	Why? <u>Not of the form y=kx</u>	Why? <u>They have the same ratio.</u>	Why? <u>Goes through (0,0)</u>	Why? <u>It's in the form y=kx</u>									
Constant of Proportionality k= <u>—</u>	Constant of Proportionality k= <u>—</u>	Constant of Proportionality k= <u><math>\frac{3}{2}</math></u>	Constant of Proportionality k= <u><math>\frac{1}{6}</math></u>	Constant of Proportionality k= <u>3</u>									

Getting Started: from M2-8	<p>Government agencies and civil rights groups monitor enrollment data at universities to ensure that different groups are fully represented. One study focused on the enrollment of women at a certain university.</p> <p style="text-align: center;"><b>The study found that 3 out of every 5 students enrolled were women.</b></p> <p style="text-align: center;"> <math>\swarrow</math> female   <math>\swarrow</math> total  <math>2 \leftarrow</math> male         </p> <p>Use the findings of the study to write each ratio and equation.</p>			
		<u>Ratio in Words</u>	<u>Ratio in Numbers</u>	<u>Equation</u>
	The number of enrolled <u>female</u> students to the <u>total</u> number of students.	$\frac{\text{female}}{\text{total}}$	$\frac{3}{5}$	$y = \frac{3}{5}x$
	The number of enrolled <u>male</u> students to the <u>total</u> number of students.	$\frac{\text{male}}{\text{total}}$	$\frac{2}{5}$	$y = \frac{2}{5}x$
	The number of enrolled <u>female</u> students to the number of enrolled <u>male</u> students.	$\frac{\text{female}}{\text{male}}$	$\frac{3}{2}$	$y = \frac{3}{2}x$
The number of enrolled male students to the number of enrolled female students.	$\frac{\text{male}}{\text{female}}$	$\frac{2}{3}$	$y = \frac{2}{3}x$	

Ratio:  
Compares 2  
quantities

$$\frac{y}{x}$$

# Module 2—T1L1---Post Secondary Proportions

Use the findings from the enrollment study on the previous page to make predictions.

Activity 1.1—  
Representing  
Proportional  
Relationships  
(M2-9—M2-11)

Enrollment in the  
University

3 women  
2 men

5 Total

$\frac{3}{5}$  female  
total

$\frac{2}{5}$  male  
total

~~$\frac{3}{5} = \frac{x}{4000}$~~   
cross multiply  
 $3 \times 4000 = 5x$   
 $\frac{12000}{5} = \frac{5x}{5}$   
 $2400 = x$

- Find the total number of enrolled female students, if there are 4000 total students.

$$\frac{\text{female}}{\text{total}} = \frac{3}{5} = \frac{x}{4000}$$

- If there are 250 total students enrolled in the university, how many males are enrolled in the university.

~~$$\frac{\text{male}}{\text{total}} = \frac{2}{5} = \frac{x}{250}$$~~

$$\frac{500}{5} = \frac{5x}{5}$$

$$100 = x$$

- If there are 6000 males enrolled at the university, how many total students are enrolled?

~~$$\frac{\text{total}}{5} = \frac{6000}{x}$$~~

$$2x = 30000$$

$$x = 15000$$

- How many female students are there if 800 students enrolled are male?

$$\frac{f}{m} = \frac{3}{2} = \frac{x}{800}$$

$$2400 = 2x$$

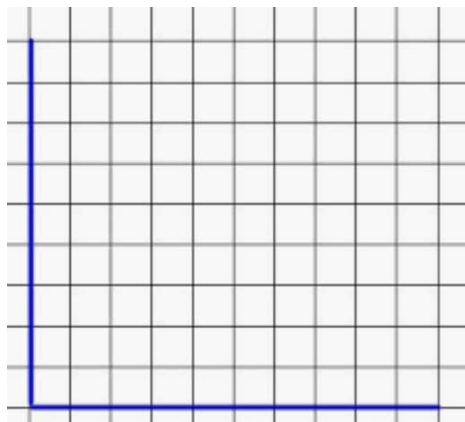
$$1200 = x$$

- Write an equation to represent the number of enrolled female students (F) to the number of enrolled male students (M).

Create graphs to  
display each ratio

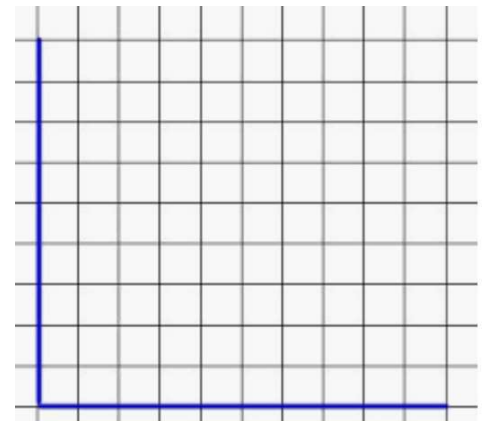
Describe the  
similarities and  
Differences  
between the 2  
graphs.

The total number of female students (y) to  
the total number of students enrolled (x)



Equation: \_\_\_\_\_

The total number of male student (y), to  
the total number of students enrolled (x)



Equation: \_\_\_\_\_

# Module 2—T1L1---Post Secondary Proportions

## Activity 1.2 Warm-up

Identify the constant of proportionality for each line

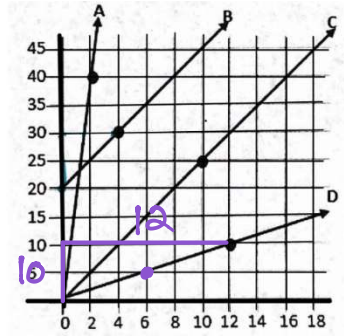
A  $\frac{40}{2} = \frac{20}{1}$

B none

C  $\frac{25 \div 5}{10 \div 5} = \frac{5}{2}$

D  $\frac{10 \div 2}{12 \div 2} = \frac{5}{6}$

$k = \frac{y}{x}$



## Comparing Ratios and Graphs

Examine the graph below. What is the major difference between the two lines on the graph?

Use the graph on the right to answer the following questions.

Line  $y_1$ :  
Proportional: Yes No

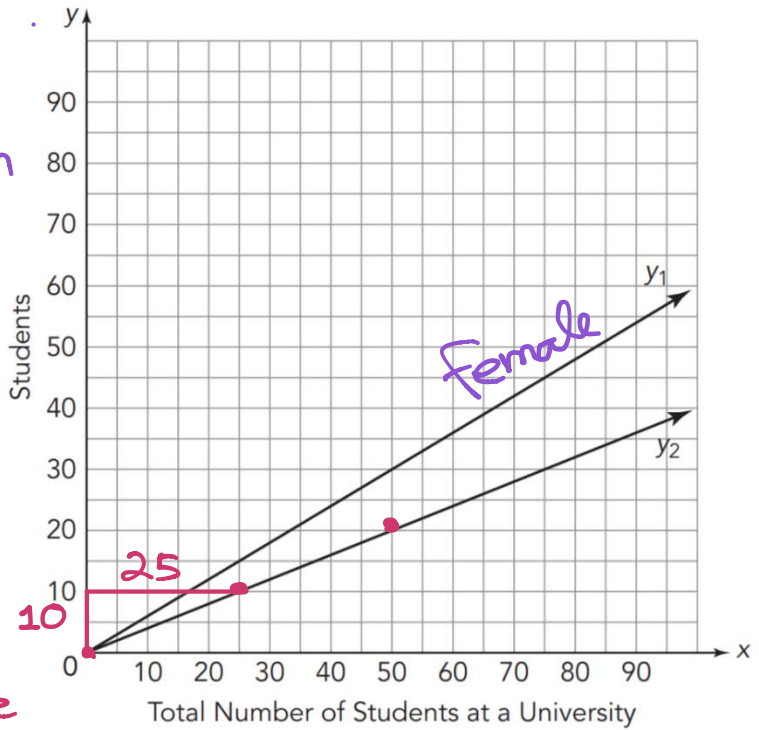
Why? It goes through (0,0)

Constant of Proportionality  
 $*k = \frac{15}{25} = \frac{3}{5}$  female

Line  $y_2$ :  
Proportional: Yes No

Why? It goes through (0,0)

Constant of Proportionality  
 $k = \frac{10}{25} = \frac{2}{5}$  male



Which line represents males?  $y_2$  females?  $y_1$  How do you know? Label the lines on the graph.

The ratio of the number of students who enjoy music to the total number of students is slightly more than the ratio of female students to the total number of students. Draw a line that represents this and label it  $y_3$  or music lovers.

The ratio of students who work full time to the total students is less than the number of females enrolled to total students, but more than the ratio of males enrolled to total students. Draw a line that represents this and label it  $y_4$  or full-time.

# Module 2—T1L1---Post Secondary Proportions

## Activity 1.3 Comparing Speeds

Distance  
Time

What does the point (0,0) mean for the context of this problem?

### Daisa

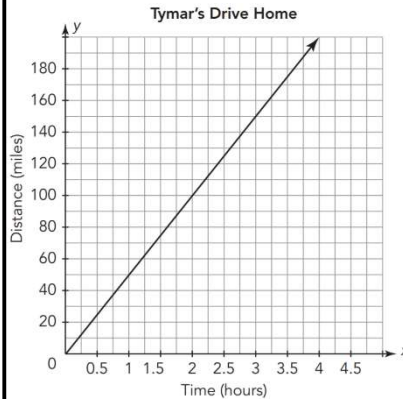
Daisa attends college in another state. During summer break, she drives home from college to visit her family and friends. She decides to keep track of the time it takes her to drive home from school. She records her distance after various numbers of hours. Her data is shown in the table below.

Daisa's Drive Home

Time (hours)	Distance (miles)
3	180
2	120
1.5	90
2.5	150

### Tymar

Tymar goes to school with Daisa. He also drives home, but takes a different route. His trip is shown in the graph.



### Alisha

Alisha also goes to the same school. She offers to drive Daisa and Tymar home to save on gas money. When asked how fast she drives, she says the distance traveled,  $y$ , for the time,  $x$ , can be expressed as  $y=57x$

Are these relationships proportional?  
How do you know?

Write a ratio for distance to time.  
(how fast is each person driving?)

Compare their speeds.

Rank the friends in order from slowest driver to fastest driver.

# Module 2—T1L1---Post Secondary Proportions

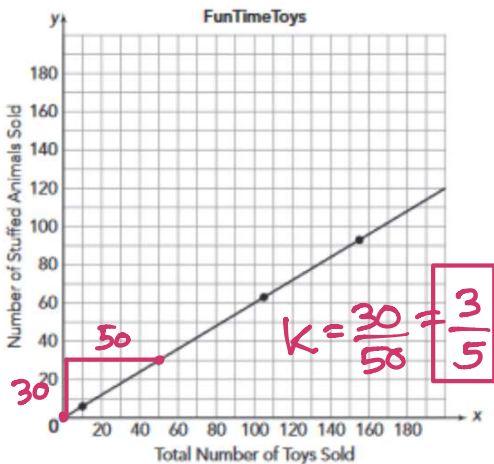
Three toy stores review their inventory to represent the relationship between the total number of stuffed animals sold to the total number of toys sold.

$$\frac{\text{Total Stuffed Animals}}{\text{Total Toys}}$$

$$k = \frac{y}{x}$$

Each toy store represented their relationship in different ways. Find the constant of proportionality for each store.

Fun Time Toys



Toy Soldiers

$$y = \frac{1}{2}x$$

$k$

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

The Toy Box

Total Number of Toys Sold	Number of Stuffed Animals Sold
0	0
12	8
54	36
102	68
156	104

$$k = \frac{2}{3}$$

Which toy store had the greatest ratio (constant of proportionality) of stuffed animals to total toys?

$$\frac{3}{5} = 0.6$$

$$\frac{1}{2} = 0.5$$

$$\frac{2}{3} = 0.666\dots$$

Toy Box

Which toy store had the smallest ratio (constant of proportionality) of stuffed animals to total toys?

Toy soldiers ( $\frac{1}{2}$ )