Lesson 1

AIM: I can determine the constant of proportionality.

WHAT MAKES A RELATIONSHIP PROPORTIONAL?

Two quantities are proportional if the ratio between the quantities is equal. ← Fractions

Mario travels 180 miles in 2.5 hours. If Mario travels at the same rate, how far can Mario travel in 5 hours?

$\frac{m}{hrs}$ $\frac{180}{2.5} = \frac{x}{5}$ 72 mph

Using the information about Mario's rate, complete the table below.

HOURS	2.5	5	7.5	10	12.5
MILES	180	360	540	720	900

(2.5, 2.5, 2.5, 2.5; ×72)

How many miles does Mario travel in one hour? Explain your solution.

180/2.5 = 72 mph

The constant of proportionality is the value of the ratio of two proportional quantities.

Examine the table below. Describe the patterns that are true.

FEET (X)	INCHES (Y)	$\frac{Y}{X}$ in/ft
1	12	12/1 = 12
2 ×12	24	24/2
3 ×12	36	36/3
4 ×12	48	48/4
5 ×12	60	60/5

How do you know that the number of feet is proportional to the number of inches?

y/x is equal

k = 12

Using x, the number of feet, how do you find y, the number of inches?

$y = 12x$

The constant of proportionality can be described with the equation $y = kx$

Y - total (output) K - y/x X - input

While training for a marathon, Keith's watch reported how many calories he burned at each mile marker. The data is shown below.

MILES	1	2	3	4	5
CALORIES BURNED	117	234	351	468	585

cal/mi: $\frac{117}{1}$ $\frac{234}{2}$ $\frac{351}{3}$ $\frac{468}{4}$ $\frac{585}{5}$

1. Is the number of calories proportional to the number of miles? Explain your thinking.

yes

2. The next day, Keith ran 7.5 miles. How many calories did he burn?

$y = 117x$
$y = 877.5$

3. What is the constant of proportionality?

$k = 117$

4. Write an equation to explain the relationship between the number of miles and the calories burned.

$y = 117x$

Determine if the tables below are proportional. If so, write an equation representing the constant of proportionality.

CUPS OF OIL (x)	CUPS OF WATER (y)	Y/X
1.5	6	6/1.5
4	16	16/4
5.5	22	22/5.5
7.5	30	30/7.5

EQUATION: $y = 4x$

HOURS	MILES WALKED	Y/X
2	3	3/2
4	6	6/4
6	9	9/6
8	12	12/8

EQUATION: $y = 1.5x$