

day 2

CONSTANT OF PROPORTIONALITY

Two quantities are proportional if the ratio between the quantities is equivalent.

CONSTANT OF PROPORTIONALITY

- The value of the ratio of two proportional quantities.
- Represented by the equation $y = kx$, where y represents the y-values in a table/graph and x, represents the x-values in the table/graph.

$$y = \begin{matrix} \text{dependent} \\ \text{variable} \\ \text{y-values} \end{matrix} \quad k = \frac{y}{x} \quad \begin{matrix} \text{aka:} \\ \text{unit rate} \\ \text{constant of} \end{matrix} \quad x = \begin{matrix} \text{independent} \\ \text{variable} \\ \text{x-values} \end{matrix}$$

proportionality

PROPORTIONALITY AND TABLES

Tables are proportional if the ratio of $\frac{y}{x}$ all simplify to the same unit rate.

x	y	$\frac{y}{x}$
2	6	$\frac{6}{2} = 3$
4	16	$\frac{16}{4} = 4$
6	30	$\frac{30}{6} = 5$
8	48	$\frac{48}{8} = 6$

different unit rates
= NOT proportional

x	10	20	30	40
y	5	10	15	20
$\frac{y}{x}$	$\frac{5}{10} = .5$	$\frac{10}{20} = .5$	$\frac{15}{30} = .5$	$\frac{20}{40} = .5$

Proportional? no

If, yes k = -

Equation (y=kx) -

Proportional? Yes

If, yes k = .50

Equation (y=kx) $y = .50x$

$$x = 10$$

$$y = .50(10) = 5$$

Determine if the tables below are proportional. If yes, identify the constant of proportionality (k) and write an equation (y=kx).

CUPS OF OIL	CUPS OF WATER	Y/X
1.5	6	$\frac{6}{1.5} = 4$
4	16	$\frac{16}{4} = 4$
5.5	22	$\frac{22}{5.5} = 4$
7.5	30	$\frac{30}{7.5} = 4$

Proportional? YES

Constant k = 4

Equation (y=kx) y = 4x

HOURS	MILES WALKED	Y/X
2	3	$\frac{3}{2} = 1.5$
4	6	$\frac{6}{4} = 1.5$
6	9	$\frac{9}{6} = 1.5$
8	12	$\frac{12}{8} = 1.5$

Proportional? YES

If, yes k = 1.5

Equation (y=kx) y = 1.5x

FEET	INCHES	Y/X
3	36	$\frac{36}{3} = 12$
5	60	$\frac{60}{5} = 12$
6	72	$\frac{72}{6} = 12$
8	96	$\frac{96}{8} = 12$

Proportional? YES

If, yes k = 12

Equation (y=kx) y = 12x

Given that each table is proportional, find missing values in each table.

Example 1: The table shows the relationship between the number of cases and the total number of sodas at a store.

X	Y
Cases	Sodas
1	12
5	60
7	84
10	120
12	144

$\frac{12}{1} = 12$
 $- y = 12(5)$
 $- y = 12(10)$

k = 12

y = 12x

You try: The table shows the relationship between the number of tickets and the total cost to go to a county fair.

X	Y
Tickets	Cost
3	46.50
5	77.5
6	93
10	155
14	217

$\frac{46.5}{3} = 15.5$
 $- y = 15.5(5)$
 $- y = 15.5(10)$

k = 15.5

y = 15.5x