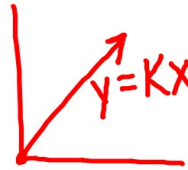


9-1 Variation



- **Direct Variation:** $y = kx$, $k \neq 0$
 k is constant of variation

"y varies directly as x"

"y is directly proportional to x"

- **Inverse Variation:** $y = \frac{k}{x}$, $k \neq 0$, $x \neq 0$

"y varies inversely as x"

"y is inversely proportional to x"

- **Joint Variation:** $y = kxz$, $k \neq 0$

"y varies directly (jointly) with x and z"

"y is jointly proportional with x and z"

1

What type of variation is shown by the data?

R	10	20	30	40
T	30	15	10	7.5

$$RT = 300$$

$$RT = \frac{k}{R}$$

$$T = \frac{k}{R}$$

INVERSE

2

Write an equation relating the variables. Then solve the problem.

If z varies directly with x and y and inversely

as w^3 , and $z = 3$ when $x = 4$, $y = 3$, and $w = 2$,

find w when $z = 5$, $x = 10$, and $y = 16$.

$$z = \frac{2xy}{w^3}$$

$$z = \frac{kxy}{w^3}$$

$$3 = \frac{k(4)(3)}{2^3}$$

$$5 = \frac{2(10)(16)}{w^3}$$

$$w = 4$$

3

Write an equation relating the variables. Then solve the problem.

The volume (V) of a geometric solid varies jointly with the square of a base edge (e) and its height (h). If $V = 60 \text{ in}^3$ when $e = 6 \text{ in}$ and $h = 5 \text{ in}$, find h when $V = 100 \text{ in}^3$ and $e = 5 \text{ in}$.

$$\begin{aligned} V &= ke^2h & V &= \frac{1}{3}e^2h \\ 60 &= k(36)(5) & 100 &= \frac{1}{3}(25)h \\ \frac{1}{3} &= k & h &= 12 \text{ in} \end{aligned}$$