

Direct, Inverse, Joint Variation

Joint variation - When a quantity varies directly with the product of two or more other quantities.

Write an equation for the given relationship.

a. r varies inversely with s $r = \frac{k}{s}$

b. z varies jointly with x and the square root of y $z = kx\sqrt{y}$

c. p varies inversely with the cube of q $p = \frac{k}{q^3}$

d. m varies directly with the square of n and inversely with p
 $m = \frac{kn^2}{p}$

e. z varies jointly with u and v and inversely with the square of w
 $z = \frac{k \cdot u \cdot v}{w^2}$

Put the rest of these notes on the bottom of page 131 of your notebook!

Finding Equations:

1. Write general equation $y =$
2. Substitute values for given variables.
3. Solve for k.
4. Write equation.

- a. x varies directly with y. When $x = 4$, $y = 3$

$$x = k \cdot y \quad 4 = k \cdot (3) \quad x = \frac{4}{3}y$$

$$\frac{4}{3} = k$$

- b. x varies inversely with y. When $x = 8$, $y = -1$

$$x = \frac{k}{y} \quad 8 = \frac{k}{-1} \quad -8 = k \quad x = \frac{-8}{y}$$

- c. x varies jointly with y and z and inversely with v.
 When $x = 8$, $y = -1$, $z = 5$, and $v = 2$.

$$x = \frac{k \cdot y \cdot z}{v} \quad 8 = \frac{k(-1)(5)}{2}$$

ok

$$x = \frac{-16}{5} \frac{yz}{v}$$

$$16 = k(-5)$$

$$-\frac{16}{5} = k$$

better

$$x = \frac{-16yz}{5v}$$