

### Joint Variation

A relationship between three variables that can be written in the form...

$$y = k \cdot x \cdot z, \text{ where } k \neq 0$$

$k$  is constant of variation

$y$  varies jointly with  $x$  and  $z$

Given  $y$  varies jointly with  $x$  and  $z$ , if  $y = 24$  when  $x = 2$  and  $z = 3$ ,  
find  $y$  when  $x = 6$  and  $z = 3$  and find  $y$  when  $x = 4$  and  $z = 1$ .

## Combined Variation

A relationship that contains both direct and inverse variation

$$y = \frac{k \cdot x}{z}, \text{ where } k \neq 0$$

$k$  is constant of variation

Variables that vary directly appear in numerator  
and variables that vary inversely appear in the denominator

$x$  varies directly with  $y$

$z$  varies inversely with  $y$

Given  $y$  varies directly with  $x$  and inversely with  $z$ , if  $y = 12$  when  $x = 2$  and  $z = 3$ ,  
find  $y$  when  $x = 3$  and  $z = 9$  and find  $y$  when  $x = 1$  and  $z = 6$ .