

# Unit # 1 – Direct Variation and Inverse Variation

<p><b>Direct Variation Equation:</b> _____          where k is called the constant of variation  <b>Wording:</b> <i>y varies directly with x</i></p>	<p><b>Inverse Variation Equation:</b> _____          where k is called the constant of variation  <b>Wording:</b> <i>y varies inversely with x</i></p>
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**Steps to Solve Direct and Inverse Variation Problems** →

- 1.) Create an equation based on how the problem is worded where the constant of variation “k” is unknown.
- 2.) Substitute values in for each variable in the problem where then you will have to solve for k.
- 3.) Rewrite your equation (where k is now known) so you can answer questions using the completed equation.

**Examples: Complete each problem using the appropriate type of variation.**

<p>1.) Suppose y varies directly with x where <math>y = 21</math> when <math>x = 7</math>.</p> <p>a.) Write an equation for this variation.</p>   <p>b.) Find y when <math>x = 15</math>.</p>   <p>c.) Find x when <math>y = 72</math>.</p>	<p>2.) Suppose y varies inversely with x where <math>y = 2</math> when <math>x = 9</math>.</p> <p>a.) Write an equation for this variation.</p>   <p>b.) Find y when <math>x = 3</math>.</p>   <p>c.) Find x when <math>y = \frac{2}{3}</math>.</p>	<p>3.) Suppose z varies directly with x and inversely with y where <math>x = 6</math>, <math>y = 2</math>, when <math>z = 15</math>.</p> <p>a.) Write an equation for this variation.</p>   <p>b.) Find z when <math>x = 4</math> and <math>y = 2</math>.</p>   <p>c.) Find x when <math>y = 10</math> and <math>z = 6</math>.</p>
<p>4.) A varies directly as B and inversely as the square root of C where <math>A = \frac{3}{2}</math> when <math>B = 2</math> and <math>C = 16</math>.          Find C when <math>A = 9</math> and <math>B = 6</math>.</p>	<p>5.) The height h of a cylinder varies directly with the volume of the cylinder and inversely with the square of the cylinder’s radius r. If a cylinder’s height is 147.2 ft, volume is <math>750 \text{ ft}^3</math>, and radius is 4 ft, then what is the radius of a cylinder with a height of 43.6 ft and a volume of <math>500 \text{ ft}^3</math>?</p>	