

**DIRECT, INVERSE AND JOINT VARIATION WORKSHEET****Direct Variation:** $y = kx$ **Inverse Variation:** $y = k/x$ **Joint Variation:** $y = kxz$ **Combined Variation:** Combining any of the three types of variation listed above within a single problem.**Four Steps to Solve a Variation Problem**

1. Write the general variation formula for the problem.
2. Use the formula to find the constant of variation, k .
3. Rewrite the formula, including the value of k .
4. Answer the question.

State whether each equation represents a direct, inverse, or joint variation. Name the constant of variation.

1) $y = 2x$

2) $\frac{x}{5} = y$

3) $xy = 12$

4) $D = \frac{3}{4}gh$

Translate each statement into a formula. Use k as the constant of variation.

5) E varies jointly as M and the square of V.

6) The volume, V, of a gas varies directly as the temperature, T, and inversely as the pressure P.

7) The mass, M, of a cement block varies jointly as the length, L, width, W, and thickness, T, of the block.

8) P varies directly as the square of V and inversely as R.

Write an equation for each statement. Then, solve the equation.

9) If y varies inversely as x and $y = 2$ when $x = 8$, find x when $y = 14$.10) Suppose y varies jointly with x and z . If $y = 20$ when $x = 2$ and $z = 5$, find y when $x = 14$ and $z = 8$.11) If y varies inversely as x and $x = 7$ when $y = 21$, find y when $x = 42$.12) Find y when $x = 1.5$, if y varies directly as x and $y = -16$ when $x = 6$.

1) Direct ; 2

2) Direct ; $\frac{1}{5}$

3) Inverse ; 12

4) Joint ; $\frac{3}{4}$

$$5) E = kmV^2 \quad 6) V = \frac{kI}{\rho} \quad \rightarrow M = kLWT \quad 8) P = \frac{kV^2}{R}$$

$$9) y = \frac{16}{x} ; x = \frac{8}{7}$$

$$10) y = 2xz ; y = 224$$

$$11) y = \frac{147}{x} ; y = 3.5$$

$$12) y = \frac{-8}{3}x ; y = -4$$