



Algebra 2 Workbook

Advanced equations

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MATH

DIRECT VARIATION

- 1. If $10k = 5$ and $kx = 3$, find x .

- 2. If x and y vary directly and the constant of variation, k , equals $1/3$, what is the value of y when $x = 54$, assuming the direct variation relationship between the variables is given by $y = kx$?

- 3. A restaurant takes in \$15,000 in a 5 hour period. Write a direct variation equation for the relationship between income and number of hours. Estimate how many hours it would take the restaurant to earn \$35,750.

- 4. If x varies directly with y and $y = 4$ when $x = 20$, what is the value of the constant of variation, k , assuming the direct variation relationship between the variables is given by $y = kx$?

- 5. If x varies directly with y and $y = 15$ when $x = 5$, what is the value of x when $y = 36$, assuming the direct variation relationship between the variables is given by $y = kx$?



■ 6. If x varies directly with y and $y = 7$ when $x = 42$, what is the value of y when $x = 54$, assuming the direct variation relationship between the variables is given by $y = kx$?



INVERSE VARIATION

■ 1. If $k/3 = 6$ and $k/x = 2$, find x .

■ 2. The length of the base of a triangle with constant area varies inversely with the triangle's height. When the base is 5 cm long, the height is 6 cm. Find the length of the base when the height is 3 cm.

■ 3. If x and y vary inversely and the constant of variation, k , equals $1/3$, what is the value of y when $x = 8$?

■ 4. If x varies inversely with y and $y = 5$ when $x = 6$, what is the value of the constant of variation, k ?

■ 5. If x varies inversely with y and $y = 4$ when $x = 2$, what is the value of x when $y = 1/2$?

■ 6. If x varies inversely with y and $y = 3$ when $x = 9$, what is the value of y when $x = 1/4$?



DECIMAL EQUATIONS

- 1. Solve the decimal equation.

$$0.34x - 0.62 = 1.25$$

- 2. Solve the decimal equation.

$$0.1(2.1a - 1.4a) + 3.57 = 2.8$$

- 3. Solve the decimal equation.

$$4a + 6a = 1.7$$

- 4. Solve the decimal equation.

$$0.12n + 3.6 = 4.8$$

- 5. Solve the decimal equation.

$$5n - 6.1 = -2.9$$

- 6. Solve the decimal equation.



$$3.2x + 2.6 = 1.8x - 4.4$$



FRACTIONAL EQUATIONS

- 1. Solve for the variable.

$$2x - 5 = \frac{4x + 3}{5}$$

- 2. Solve for the variable.

$$\frac{4}{3}x = 18$$

- 3. Solve for the variable.

$$\frac{3}{4}x + \frac{5}{4} = \frac{7}{8}$$

- 4. Solve for the variable.

$$\frac{4}{7}x + \frac{1}{7} = \frac{10}{7}$$

- 5. Solve for the variable.

$$\frac{1}{2}a - \frac{5}{4}a = -\frac{10}{3} + \frac{5}{2}a$$



■ 6. Solve for the variable.

$$\frac{1}{2} \left(\frac{1}{2}x - \frac{1}{3} \right) = \frac{7}{3} + \frac{9}{2}$$



RATIONAL EQUATIONS

- 1. Solve the equation.

$$\frac{x-3}{x+3} = \frac{4}{5}$$

- 2. Solve the equation.

$$\frac{x}{6} - \frac{5}{3x} = \frac{1}{4}$$

- 3. Solve the equation.

$$\frac{2}{x+5} = \frac{4}{x-1}$$

- 4. Solve the equation.

$$2 + \frac{6}{x-7} = -\frac{8}{x+3}$$

- 5. Solve the equation.



$$\frac{5}{a-4} - \frac{3}{a+4} = -\frac{1}{a^2-16}$$

■ 6. Solve the equation.

$$\frac{1}{2x^2} + \frac{3}{4x} = \frac{x+7}{x^2}$$



RADICAL EQUATIONS

- 1. Solve the radical equation for the variable.

$$\sqrt[3]{2x-1} + 5 = 7$$

- 2. Solve the radical equation for the variable.

$$2\sqrt{x} = 14$$

- 3. Solve the radical equation for the variable.

$$\sqrt{x+1} - 3 = 2$$

- 4. Solve the radical equation for the variable.

$$\sqrt{x-3} + 2 = \sqrt{2x+1}$$

- 5. Solve the radical equation for the variable.

$$\sqrt{1-x} - x = 5$$



- 6. Solve the radical equation for the variable.

$$\sqrt{x^2 - 2x + 4} + 4 = x$$



MULTIVARIABLE EQUATIONS

- 1. Solve for x if $y = z/x$.
- 2. Solve for t if $4s - 3t + u = 5$.
- 3. Solve for y if $z - x + 4y = 3x + z$.
- 4. Solve for c if $2a - b + 3c = 2b - 4a + c$.
- 5. Solve for y if $2x - y + z = 3x$.
- 6. Solve for a if $x + y = 3ab + c$.



MULTIVARIABLE RATIONAL EQUATIONS

- 1. Solve the abstract equation for x , if $x \neq 0$.

$$\frac{1}{x} - z = y$$

- 2. Solve the abstract equation for y , if $x \neq 0$.

$$\frac{y}{x} + 3x = 2z$$

- 3. Solve the abstract equation for a , if $a \neq 0$ and $b \neq 0$.

$$\frac{bc}{a} - cxy = \frac{z}{b}$$

- 4. Solve the abstract equation for y , if $y \neq 0$, $b \neq 0$, and $n \neq 0$.

$$\frac{1}{y} + \frac{a}{b} = \frac{m}{n}$$

- 5. Solve the abstract equation for x , if $z \neq 0$, $n \neq 0$, and $b \neq 0$.

$$\frac{2x + y}{z} - \frac{m}{n} = \frac{a}{b}$$



- 6. Solve the abstract equation for x , if $x \neq 0$ and $y + z \neq 0$.

$$\frac{1}{x} + \frac{2}{y+z} = 3$$



