Algebra

Fundamentals of Algebra

Order of Precedence:

1. **Parenthesis**
2. **Exponentials (squares, square roots, etc.)**
3. **Multiplication and Division**
4. **Addition and Subtraction**

Examples I: Use a = 15, b = 3, t = 4, solve each equation for "x"

1. x = $(a - b) / t$

Solution: $\mathbf{x = (15 - 3) / 4}$
$\mathbf{x = 12 / 4}$
$\mathbf{x = 3}$

2. x = $(2(a - b) + 3b - 5) / (t + b)$

Solution: $\mathbf{x = 2 \cdot (15 - 3) + 3(3) - 5 / (4 + 3)}$
$\mathbf{x = 2 \cdot (12) + 9 - 5 / 7}$
$\mathbf{x = 4}$

3. x = $2(a - b)^2 / 10$

Solution: $\mathbf{x = 2 \cdot (15 - 3)^2 / 10}$
$\mathbf{x = 2 \cdot (12)^2 / 10}$
$\mathbf{x = 2 \cdot (144) / 10}$
$\mathbf{x = 28.8}$

Examples II: Use the following formula to compute the desired quantity:

$$\mathbf{d = v\,t + \tfrac{1}{2}\,a\,t^2}$$

1. If v = 5, t = 2, a = 10; what is d ?

Solution: $\mathbf{d = 5(2) + \tfrac{1}{2} \cdot (10) \cdot (2)^2}$
$\mathbf{d = 10 + \tfrac{1}{2} \cdot (10) \cdot (4)}$
$\mathbf{d = 30}$

2. If d = 80, t = 2, a = 10; what is v ?

Solution: $\mathbf{d = v \cdot t + \tfrac{1}{2}\,a\,t^2}$
$\mathbf{v \cdot t = d - \tfrac{1}{2}\,a\,t^2}$
$\mathbf{v = (d - \tfrac{1}{2}\,a\,t^2) / t}$
$\mathbf{v = 80 - \tfrac{1}{2}(10)(2^2) / 2}$
$\mathbf{v = (80 - 20) / 2}$
$\mathbf{v = 60 / 20}$
$\mathbf{v = 3}$

More Practice Algebra Problems

Solve for x unless otherwise instructed:

1) $3x = 17$

2) $x/5 = 13$

3) $x/3 + 21 = 14$

4) $2(5-x) = 10(20x - 7)$

5) $(15/x + 3)7 - 9x = 0$

6) $5x^2 = 17$

7) $1/4x^2 - 3/5 = 5/7$

8) $3x / 8 - 1/3 = 15$

9) $d = ½(at^2)$ *Solve for t in terms of a and d*

10) $V_f^2 = V_i^2 + 2ad$ *Solve for d in terms of V_i, V_f, and a*

Practice Algebra Problems Solutions

1) $x = 17/3$
$x = 5.67$

2) $x = 13(5)$
$x = 65$

3) $x/3 + 21 = 14$
$x/3 = 14 - 21$
$x/3 = -7$
$x = -7(3)$
$x = -21$

4) $2(5-x) = 10(20x - 7)$
$10 - 2x = 200x - 70$
$200x + 2x = 10 + 70$
$202x = 80$
$x = 80/202$
$x = 0.396$

5) $(15/x + 3)7 - 9x = 0$
$105/x + 21 = 9x$
$105 + 21x = 9x^2$
$9x^2 - 21x - 105 = 0$

(use the quadratic equation)

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{21 \pm \sqrt{-21^2 - 4(9)(-105)}}{2(9)}$$

$$x = \frac{21 \pm \sqrt{441 + 3780}}{18}$$

$$x = \frac{21 \pm \sqrt{4221}}{18}$$

$$x = \frac{21 \pm 64.97}{18}$$

$$x = \frac{21 \pm 64.97}{18}$$

$x = 4.776$ or -2.443

6) $5x^2 = 17$
$x^2 = 17/5$
$x = \sqrt{17/5}$
$x = 1.84$

7) $1/4x^2 - 3/5 = 5/7$
$1/4x^2 = 5/7 + 3/5$
$1/4x^2 = 25/35 + 21/35$
$x^2 = 46/35 * 4$
$x^2 = 5.257$
$x = \sqrt{5.257}$
$x = 2.29$

8) $3x / 8 - 1/3 = 15$
$3x / 8 = 15 + 1/3$
$3x = 8\ (15 + 1/3)$
$3x = 8\ (15.33)$
$3x = 122.64$
$x = 122.64 / 3$
$x = 40.88$

9) $d = 1/2at^2$ (*Solve for t in terms of a and d)*
$t^2 = 2d / a$
$$t = \sqrt{\frac{2d}{a}}$$

10) $V_f^2 = V_i^2 + 2ad$
(*Solve for d in terms of V_f and a)*
$$d = \frac{v_f^2 - v_i^2}{2a}$$