

Part 1 - Sample Problems

1. Perform each of the indicated operations.

(a) $21 - 2(-5) = 31$

(b) $\sqrt{60 \div 4 \div 5 + 1} = 2$

(c) $20 - |32 \div (-2)| = 4$

(d) $\frac{-3^2 + 30 \div (-2)}{-4} = 6$

(e) $(9 - 6)^2 = 9$

(f) $9^2 - 6^2 = 45$

(g) $16 - \sqrt{2^3 - 2^2} - 5 = 9$

(h) $\sqrt{25} \cdot \frac{-3^5 + (-1)^3}{\left|(-5)^3 - \left|6 + (-5)^3\right|\right|} = -5$

(i) $\frac{3 + (6^2 - 3^2) + (3^3 - 2^3) - 9}{4^2 + (5 - 3)^2} = 2$

(j) $\sqrt{\sqrt{36} - 2(3^2 + 3^3) + 2(4(17 - 2^3) - 3^2)} = 3$

(k) $2 \cdot 3^2 - (6 - 4 + (6 \cdot 4 - 3(2^4 - 12))) = 4$

2. Let $a = -4$, $b = 2$, and $x = -3$. Evaluate each of the following expressions.

(a) $a^2 - b^2 = 12$

(b) $(a - b)^2 = 36$

(c) $a^b - 2bx + x - |2x| = 19$

(d) $\frac{-x^2 + (x + 2)^2}{(x - 1)} = 2$

(e) $\frac{x - 1}{x + 3} = \text{undefined}$

3. Consider the equation $x^2 - 10x + x^3 - 4 = 4(x + 5)$. In each case, determine whether the number given is a solution of the equation or not.

(a) $x = 0$ $-4 \neq 20$ no

(b) $x = -2$ $12 = 12$ yes

(c) $x = -3$ $8 = 8$ yes

Part 2 - Practice Problems

1. Simplify each of the following expressions.

(a) $||-20 - 3(-4)| - 10| = 2$

(b) $15 - 3(-2) = 21$

(c) $\left(\left((1-2)^2 - 2\right)^2 - 2\right)^2 - 2 = -1$

(d) $\sqrt{-7^2 + 15(2)^2 - 18 \div 3 \div 3} = 3$

(e) $\frac{-6^2 \div 2 \cdot 3 + |2^2 \cdot 12 - 11| + 2(-1)^3 - (-1)^2}{(-2)^2 + (-2)^3} = 5$

(f) $\sqrt{36} - \sqrt{81} + 2\sqrt{25} = 7$

2. Evaluate $\frac{8x + x^2 - 33}{x + 11} = x - 3$ if

(a) $x = 0$ -3

(b) $x = -11$ undefined

3. Evaluate $\frac{x-2}{2-x}$ if

(a) $x = 0$ -1

(b) $x = 2$ undefined

4. Consider the equation $-x + x^3 + 6 = 3(-x^2 + x + 2)$. In each case, determine whether the number given is a solution of the equation or not.

(a) $x = 0$ $6 = 6$ yes

(b) $x = 1$ $6 = 6$ yes

(c) $x = -1$ $6 \neq 0$ no

(d) $x = 2$ $12 \neq 0$ no

(e) $x = -2$ $0 \neq -12$ no

(f) $x = 3$ $30 \neq -12$ no

(g) $x = -3$ $-18 \neq -30$ no

(h) $x = 4$ $66 \neq -30$ no

(i) $x = -4$ $-54 = -54$ yes