

## Algebra Refresher Workshop: Practice Problems

Simplify the following:

1.  $\overline{(3)^2 + (-5)^2} + \overline{(3)^2 - (2)^2}$
2.  $(2 - 7)^2$
3.  $\frac{4 - 7 \cdot 3}{2}$

Multiply the following:

1.  $(x - 3)(x + 7)$
2.  $(3x - 1)(x + 5)$
3.  $(4x + 1)^2$
4.  $(2x - y)(x + 3y)$

Factor the following:

1.  $x^2 - x - 30$
2.  $x^2 + 6x - 16$
3.  $3x^2 - 5x - 2$
4.  $2x^3 - 10x^2 - 12x$

Solve for  $x$  using the quadratic formula:

1.  $2x^2 - 5x - 3 = 0$
2.  $9x^2 + 1 = 6x$
3.  $x^2 - 2x + 5 = 0$
4.  $3x^2 + 10x = 2$

Solve for  $x$ :

1.  $2(x + 3) - 4x = x - 3$

2.  $9x^3 = 36x$

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

4.  $\sqrt[3]{5x + 3} = -3$

ANSWERS:

Simplify the following:

1.  $\sqrt{34} + \sqrt{5}$

2. 25

3.  $-\frac{17}{2}$

Multiply the following:

1.  $x^2 + 4x - 21$

2.  $3x^2 + 14x - 5$

3.  $16x^2 + 8x + 1$

4.  $2x^2 + 5xy - 3y^2$

Factor the following:

1.  $(x + 5)(x - 6)$

2.  $(x + 8)(x - 2)$

3.  $(3x + 1)(x - 2)$

4.  $2x(x - 6)(x + 1)$

Solve for  $x$  using the quadratic formula:

1.  $x = 3$  or  $x = -1/2$

2.  $x = 1/3$

3. no solution (or  $x = 1 + 2i$ )

4.  $x = -\frac{5}{3} + \frac{\sqrt{31}}{3}$  or  $x = -\frac{5}{3} - \frac{\sqrt{31}}{3}$

Solve for  $x$ :

1.  $2(x + 3) - 4x = x - 3 \Rightarrow 2x + 6 - 4x = x - 3 \Rightarrow -2x + 6 = x - 3 \Rightarrow -3x = -9 \Rightarrow \boxed{x = 3}$

2.  $9x^3 = 36x \Rightarrow 9x^3 - 36x = 0 \Rightarrow 9x(x^2 - 4) = 0 \Rightarrow 9x(x - 2)(x + 2) = 0$ , so  $\boxed{x = 0, 2, -2}$

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

$$\frac{5x-10}{x^2+2x-8} - \frac{3x+12}{x^2+2x-8} = 4 \Rightarrow \frac{2x-22}{x^2+2x-8} = \frac{4}{1} \text{ (cross multiply)}$$

$$2x-22 = 4(x^2+2x-8) \Rightarrow 2x-22 = 4x^2+8x-32 \Rightarrow -4x^2-6x+10 = 0 \Rightarrow -2(2x^2+3x-5) = 0$$

$$-2(2x+5)(x-1) = 0, \text{ so } \boxed{x = -5/2, 1}$$

4.  $\sqrt[3]{5x+3} = -3 \Rightarrow (\sqrt[3]{5x+3})^3 = (-3)^3 \Rightarrow 5x+3 = -27 \Rightarrow 5x = -30 \Rightarrow \boxed{x = -6}$