

ALGEBRA I CONCEPTS
SKILLS TO BE MASTERED

I. Using variables, simplifying expressions, evaluating expressions, using the order of operations.

1. Simplify $3(x-4)+5(3x-2y)$
2. Simplify $2^2 - 2 \cdot 2 + 2^2 - 2 \cdot 2$
3. Evaluate $4a + 3b + c^2$ if $a = -4$, $b = 9$, and $c = -\frac{1}{2}$
4. Expand $(2x-4y)^2$
5. Add $(3a^2 - 2a - 8) + (5a^2 - 3a + 12)$
6. Subtract $4a^2 - 3a - 18$
 $6a^2 - 3a + 1$

II. Solving linear equations and inequalities, quadratic equations, rational equations, two-variable equations, variable equations, equations with absolute value.

1. Solve $5x-3 = 12(x-2)$
2. Solve $\frac{2}{3}x+1 = \frac{1}{3}x+6$
3. Solve $-\frac{4}{5}x - \frac{2}{3} > \frac{1}{2}$
4. Solve $x^2 - 64 = 0$
5. Solve for y $axy - 3y = a$
6. Solve $|3x-1|=5$
7. Solve $4x-5y=12$
 $-3x+2y=-9$
8. Solve $x^2 - 8x = -12$
9. Solve $\sqrt{x-3}=10$
10. Solve $\frac{4x-3}{5} = \frac{8}{7}$

III. Polynomials and Exponents, Factoring

1. Simplify $(-4x^2)(-3x^4)$
2. Simplify $\frac{3x^4a^{-3}}{12x^5a^{-4}}$
3. Factor $16x^2 - 9$
4. Factor $5x^2 - 17x + 14$
5. Factor $28a^2b^2c^2 + 21a^2bc^2 - 14abc$
6. Factor $10x^2 - 9x - 7$
7. Simplify $\frac{x+2}{x^2-4}$
8. Simplify $\frac{3a^2+a-2}{a^2+7a+6}$
9. Simplify $\frac{(4a^2)^3(-2a^4)^3}{(3a^4)^2(4a^{-1})}$

IV. Word Problems

1. Perimeter
2. Area
3. Distance
4. Consecutive integers
5. Direct variation
6. Inverse variation
7. % of increase / decrease
8. Mixture

V. Fractions

1. Simplify $\frac{2x^2-98}{28x^2+4x^3}$
2. Multiply $\frac{9x^4y}{7xy^2} \cdot \frac{14xy^3}{27x^6}$
3. Divide $\frac{x^4-1}{x^3+x} \div \frac{(x-1)^2}{x}$

4. Find the LCD $\frac{1}{3x-9}$, $\frac{8}{21-7x}$

5. Add $\frac{2xy}{x-2y} + \frac{x^2}{2y-x}$

6. Add $\frac{2x+1}{3x-1} + 2$

7. Simplify $\frac{x^2 + 4xy + 4y^2}{x + 2y}$

8. Divide $(x-2) \overline{)3x^3 - 5}$

VI. Functions: slope of a line, writing the equation of a line, graphing points, lines, identifying a function by a graph or map, using function notation, domain and range.

1. Find the slope $3x - 2y = 8$

2. Find the slope $(3, -4), (-1, -7)$

3. Find the slope $y = 7$

4. Write the equation of the line passing through $(-3, 4)$ and having slope $2/3$

5. Graph $x + y = 5$

6. Graph $2x + 4y = 8$

7. Graph $2x - y > 3$

8. Graph $y > 3$

9. Graph A $(3, 0)$, B $(-1, 5)$, C $(0, -3)$

10. If $f(x) = x^2 - 3x + 1$, find:

a. $f(0)$

b. $f(1)$

c. $f(-3)$

VII. Radical expressions: simplifying, using 4 basic operations

1. Simplify $\sqrt{450}$
2. Simplify $\frac{5\sqrt{40}}{50\sqrt{5}}$
3. Simplify $6\sqrt{3} + 8\sqrt{12} - \sqrt{18}$
4. Simplify $(\sqrt{5})(\sqrt{15})$
5. Simplify $\sqrt{60} - \sqrt{135}$
6. Simplify $2\sqrt{27} + 8\sqrt{48}$
7. Simplify $\sqrt{\frac{21}{2}} - \sqrt{\frac{3}{14}}$
8. Solve $\sqrt{x-1} = 3$
9. Simplify $\sqrt{72x^4y^5z^5}$
10. Simplify $-\sqrt{a^4b^8}$
11. Simplify $(3-\sqrt{5})(6+\sqrt{2})$