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### Section 1 – Expanding and Simplifying

Use proper order of operations to expand and simplify the following expressions:

1.  $3(5 - 4) - 4(3 + 1)$

2.  $6 - 4(1 - 3) + 2(-6)$

3.  $(3 + 2)$

4.  $(+ 4)$

5.  $(3 + 2) - (3 - 2)$

6.  $(- 5)$

### Section 2 –

### Section 3 – Rational Expressions

1. For what values of  $x$  is the expression  $\frac{1}{x-2}$  not defined?
2. Simplify:  $\frac{x^2 - 4}{x^2 + 2x}$
3. Combine  $\frac{1}{x} + \frac{1}{x+1}$  into a single expression.
4. Simplify:  $\frac{(x^2 - 4)(x^2 - 9)}{(x^2 - 3x)}$  Hint: factor the top to start.
5. Simplify:  $\frac{\frac{1}{x} - \frac{1}{x+1}}{\frac{1}{x} + \frac{1}{x+1}}$

### Section 4 – Solving Equations

1. Solve the linear equation:  $-2x - 5 = 4 + 2(3 - 5)$
2. Solve the following polynomial equations:
  - a)  $x^2 - 10x + 24 = 0$
  - b)  $x^2 - 8x + 2 = 0$  (Use the Quadratic Formula)
  - c)  $x^2 - 12x - 9 + 27 = 0$  (Hint: factor)
  - d)  $(x - 3)(x + 6) = 10$
3. Solve the following rational equations:
  - a)  $\frac{x^2 - 4}{x^2 - 3x} = 0$
  - b)  $\frac{x^2 - 4}{x^2 + 2x} = 0$
  - c)  $\frac{x^2 - 9}{x^2 - 3x} = 0$
  - d)  $\frac{1}{x} + \frac{1}{x+1} = \frac{1}{x-1}$
4. Solve the following radical equations:
  - a)  $\sqrt{x+1} - 8 = 0$
  - b)  $\sqrt{2x - 4} - 21 = 0$

## Section 5 – Solving Inequalities

1. Solve the linear inequality:  $9 - 4(2 - 3) - 3(5 - 2)$
2. Solve the following inequalities by simplifying to make one side zero (if needed), finding all values for which the expression is zero or undefined and then using test points on a number line. Give your answers using interval notation.

a)  $8 + 14 < 2$

b)  $(4 - ) ( - 1) ( + 2) > 0$

c)  $\text{————} = 0$

d)  $\text{————} = 1$

## Section 6 – Exponents and Radicals

# Answers

## Section 1:

1.  $11 - 24$

2.  $2 + 2$

3.  $9 + 12 + 4$

4.  $+ + 16 + 2 = 8$

5.  $9 + 18$

6.  $15 + 75 = 125$

## Section 2:

1.  $3 ( - 5 - 2)$

2.  $( - 9)( + 2)$

3.  $5 ( - 2)( - 3)$

4.  $(2 - 3)( + 4)$

5.  $( - 3)( + 3)( - 4)$

6.  $8 (2 - 5) (8 - 5)$

7.  $( + 1) (4 - 3) ( - 33 + 32 - 9)$

## Section 3:

1.  $= 0, 2, -2$

2.  $+ 6, -3$

3.  $\frac{\quad}{( \quad )( \quad )}$

4.  $\frac{\quad}{( \quad )}$

5.  $\frac{\quad}{( \quad )( \quad )}, 0$

## Section 4:

1.  $= -$

2. a)  $= 12, -2$

b)  $= 2.39, 0.28$

c)  $= 3, -, -$

d)  $= 4, 7$

3. a)  $= 1, -$

b)  $= 3, 1$

c)  $= 5$

d)  $= -$

4. a)  $= 9$

b)  $= 7$

**Section 5:**

1.  $3$

2. a)  $(2, 6)$

c)  $[3, 1] (5, )$

b)  $(2, 1) (1, 4)$

d)  $(2, 3]$

**Section 6:**

1. a)  $^-$

2. a)  $^-$

3.  $18.7208$

4.  $^-$

6.  $^-$

8.  $\frac{(- -)}{}$

b)  $(2 + 1)^-$

b)  $^- + ^-$

5. It cannot be simplified any further.

7.  $6 (6 + 1)(4 + 1)^-$

9.  $==$

c)  $2^- + 6$

c)  $\frac{^-}{+}$