

## Review of Math 9 – Part 1

### Operations with integers and fractions

#### Integers

Whole numbers that are positive and negative

#### Order of operations

- Brackets
- Exponents
- Multiplication and division in the order they occur
- Addition and subtraction in the order they occur

\_\_\_\_\_ is the result of addition

\_\_\_\_\_ is the result of subtraction

\_\_\_\_\_ is the result of multiplication

\_\_\_\_\_ is the result of division

**Example 1:** Without a calculator, evaluate. Show your work if necessary.

a)  $(-1) + 3$

b)  $4 - (-5)$

c)  $4 - 7$

d)  $(-1) \times 3$

e)  $(-4) \times (-5)$

f)  $4 \times (-7)$

g)  $(-1) \times 3 - 5$

h)  $4^2 + (-5)$

i)  $2(4 - 7)$

## Operations with fractions

### 1) Addition and subtraction of fractions

- Find a common denominator
- For each fraction, multiply the numerator and denominator (top and bottom) by the same number
- Add or subtract the numerators (tops)

### 2) Multiplication of fractions

- Multiply the numerators together
- Multiply the denominators together

### 3) Division of fractions

- Rewrite in the form of multiplication
  - Multiply the reciprocal of the second fraction

## Simplifying fractions

A fraction is in simplest form when the numerator and the denominator are as small as possible. To reduce a fraction to simplest form divide the numerator and denominator by the same number.

**Example 2:** Evaluate and simplify if necessary.

a)  $\frac{1}{5} + \frac{3}{5}$

b)  $\frac{1}{5} + \frac{4}{3}$

c)  $\frac{7}{3} - \frac{5}{6}$

d)  $\frac{2}{5} \times \frac{3}{8}$

e)  $\frac{1}{2} \div \frac{3}{4}$

f)  $\frac{2}{7} \times 4$

## Operations with integers and fractions – Review #1

Name: \_\_\_\_\_

### 1. Evaluate without a calculator.

a)  $(-1)+(-2)$

b)  $(-2)-7$

c)  $6-(-6)$

d)  $(-2)+2$

e)  $(-8)+7$

f)  $7-(-2)$

g)  $1-(-6)$

h)  $(-1)-6$

i)  $(-3)+(-7)$

j)  $(-4)-(-2)$

k)  $(-4)+(-6)$

l)  $5-2$

m)  $(-5)+(-2)$

n)  $(-7)+2$

o)  $5+(-2)$

p)  $2-(-6)$

q)  $(-6)+2$

r)  $4-6$

s)  $7+(-6)$

t)  $3-2$

u)  $(-1)+(-7)$

v)  $(-6)+(-6)$

w)  $(-3)+2$

x)  $2-7$

y)  $6-(-5)$

z)  $2+(-1)$

aa)  $(-3)-(-2)$

bb)  $(-5)-2$

cc)  $(-7)-(-6)$

dd)  $(-5)-2$

ee)  $1-(-7)$

ff)  $(-5)+7$

gg)  $4-(-2)$

### 2. Evaluate without a calculator. Show your work

a)  $20 \div 5 + 3$

b)  $15 - 4 \times 2$

c)  $4 \times 7 - 10$

d)  $(7 - 5) \times 3$

e)  $12 \div (4 - 1)$

f)  $4 \times (10 - 7)$

g)  $8 \times 7 - 4 \times 3$

h)  $15 - (3 + 2) \times 3$

i)  $(2 - 3) \times 8 + 9$

j)  $10^2 - 25$

k)  $12 + 5^2 - 36$

l)  $2^3 + 5 \times 4$

m)  $6^2 + 5 - 3^2$

n)  $4^2 \times 2 - 15$

o)  $2^2 \times (13 - 5)$

p)  $8 - 2^3$

q)  $(8 - 2)^3$

r)  $(9 - 2)^2 + 2$

s)  $14 - 36 \div 2^2$

t)  $3 \times (5^2 - 4^2)$

u)  $3^2 \times (8 + 1) \div 3$

3. Evaluate each expression. Simplify if necessary.

a)  $\frac{7}{4} \times \frac{1}{3}$

b)  $2 \times \frac{1}{2}$

c)  $\frac{4}{3} \times \frac{2}{3}$

d)  $\frac{1}{5} \times \frac{4}{3}$

e)  $\frac{5}{6} \times \frac{3}{4}$

f)  $\frac{3}{4} \times \frac{1}{6}$

g)  $\frac{8}{5} \div \frac{4}{5}$

h)  $\frac{1}{2} \times 8$

i)  $\frac{5}{6} \div \frac{1}{4}$

j)  $\frac{3}{2} \div \frac{3}{4}$

k)  $\frac{7}{9} \times \frac{5}{7}$

l)  $\frac{2}{3} \div \frac{3}{8}$

m)  $\frac{2}{3} \div 4$

n)  $\frac{7}{8} - \frac{3}{8}$

o)  $\frac{2}{3} - \frac{1}{6}$

p)  $\frac{3}{2} + \frac{5}{4}$

q)  $\frac{4}{5} - \frac{1}{4}$

r)  $\frac{1}{2} + \frac{9}{5}$

s)  $\frac{4}{5} + \frac{5}{4}$

t)  $\frac{2}{3} + \frac{2}{5}$

u)  $3 - \frac{1}{3}$

v)  $2 - \frac{6}{5}$

w)  $\frac{1}{6} + \frac{5}{6}$

x)  $\frac{1}{4} + \frac{1}{2}$

## Math 9 Review – Part 2

### Distributive Law and Like Terms

$$4x^3$$

#### Like Terms

Like terms are terms that have the same variable(s) with the same exponent(s) of the variable(s). The only thing different are the coefficients.

#### Example 1:

#### Combining Like Terms

When we combine like terms we are simplifying an algebraic expression.

- Identify like terms
- Group like terms together (be sure to include the correct sign in front of each term)
- Add/subtract the coefficients of each like term together
- Write your final answer

**Example 2:** Simplify the following expressions:

a)  $2a + 3c - 6a + 4b - 5c + 3b$

b)  $-4x + 5x^2 + 3x - 2x + 6x^2$

## Distributive Law

The distributive law is an algebra property which is used to multiply a single term and two or more terms inside a set of parentheses.

We often use the expression "**expand**" when we need to use the distributive law.

**Example 3:** Simplify the following expressions:

a)  $4(a+6)$

b)  $5+3(2b-1)$

c)  $-6(5+x)-(7x-11)$

b)  $8(c+5)-6c+2(9c-3)$

Name: \_\_\_\_\_

## Distributive Law and Like Terms – Worksheet #2

1. Simplify each expression.

a)  $8n - n$

b)  $-v - v$

c)  $1 + 3k - 8 + k$

d)  $-5x - 4 + x + 7$

e)  $-4(1 - 8n)$

f)  $6(6 + 5m)$

g)  $-7(8v - 5) + 6v$

h)  $-3 + 6(x + 4)$

i)  $-3a + 7(a + 8)$

j)  $4 + 8(x - 7)$

$$k) 5(r-2)+7(-4r+1)$$

$$l) -4(1+5x)-6(2x+1)$$

$$m) 1+2(x+6)-(8x-1)$$

$$n) 8a(a-7)-4(4a+3)$$



## Math 9 Review – Part 3

### Solving Equations

#### Solving Equations

When we solve an equation, we are trying to find the value of a variable that makes a mathematical sentence (equation) true.

In order to solve an equation, we must isolate the variable.

**Example 1:** Solve the following equations.

a)  $5x - 4 + 3 = 4$

b)  $6x - 10 = 56$

c)  $2 = 4x - 5x$

d)  $9a = 3a - 36$

#### Solving Equations with Parentheses

- Expand the parentheses
- Simplify like terms (if possible)
- Isolate the variable

**Example 2:** Solve the following equations:

a)  $2(y - 4) = 16$

b)  $10 + 2x = -4(x - 1)$

$$c) 4(x-3)+9x=-38$$

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

### Verify (check) Your Solution

Once a solution is found, we must verify that it is correct. This is done by substituting the solution back into the original equation.

**Example 3:** Verify that  $x = 7$  is a solution to the following equation:  $2(3x-5) = 32$

Name: \_\_\_\_\_

### Solving Equations – Worksheet #3

1. Solve the following equations. Show all of your work.

a)  $118 = 2(8x + 3)$

b)  $-8(-5n - 3) = -256$

c)  $-7x - 8(1 + x) = 8x + 15$

d)  $88 = 4x - 6(2x - 4)$

e)  $6x - 33 = 3 - 6(1 - 2x)$

f)  $2(1 + 4k) - 3k = 3(k + 8)$

2. Solve the following equations. Verify each solution. Show all of your work.

a)  $3(3r + 8) = 3(7 + 4r)$

b)  $5(1 + 2x) = 6x - 15$

c)  $-18 + 7x = -5x + 5(7x + 1)$

d)  $6(8m - 1) = 2 + 7(7m - 3)$

## Math 9 Review – Part 4

### Solving Equations with Rational Coefficients

When an algebraic equation contains fractions (rational expressions), we will remove the denominator(s) by multiplying each term by the **lowest common denominator**.

The lowest common denominator (LCD) is the lowest common multiple that a set of fractions share.

**Example 1:** Solve the following equations. (Eliminate any denominators first.)

a)  $14 = \frac{c}{3}$

b)  $2 - \frac{x}{5} = 3$

c)  $\frac{1}{3}a + 5 = \frac{1}{6}a - 6$

d)  $\frac{x}{5} + \frac{1}{2} = \frac{3}{10}$

$$\text{e) } \frac{x+1}{3} - \frac{x-2}{7} = 1$$

$$\text{f) } \frac{1}{2}(p+1) + \frac{1}{3}(2p+1) = 9$$

$$\text{g) } \frac{48}{a} = 6$$

$$\text{h) } 2 = \frac{12}{x+4}$$

Name: \_\_\_\_\_

## Solving Equations – Worksheet #4

1. Solve the following equations. Show all of your work.

a)  $\frac{2m}{3} = 8$

b)  $\frac{r}{3} - \frac{r}{6} = 2$

c)  $\frac{2x}{3} - 3 = \frac{x}{4}$

d)  $\frac{12}{x} = -5 + 7$

e)  $\frac{x}{2} + \frac{x}{3} - \frac{x}{4} = 9$

f)  $\frac{2x}{3} - 3x + 21 = 0$

$$g) \frac{2x}{5} + \frac{3}{4} = \frac{4x}{5} - \frac{1}{2}$$

$$h) \frac{10}{x} = -2$$

$$i) \frac{-21}{e} = 7$$

$$j) -6 = \frac{30}{n}$$

$$k) \frac{9}{-r} = 12$$

$$l) \frac{56}{x} = 64$$