

**What students need to know for...**  
**GEOMETRY 2016-2017**

NAME: \_\_\_\_\_

This is a **MANDATORY** assignment that will be **GRADED**. It is due the first day of the course. Your teacher will determine how it will be counted (i.e. homework, quiz, etc.)

Students expecting to take Geometry at Cambridge Rindge and Latin High School should have the following skills:

**General**

- Keep an organized notebook
- Be a good note taker
- Complete homework every night
- Be active learners
  - Ask questions and participate in class
  - Seek help outside of class if needed
- Work with others
- Work with and without a calculator

**Specific math skills**

- Basic facts such as multiplication tables
- Simplify/add/subtract/multiply/divide radicals
- Basic operations with integers (Order of operations)/absolute value
- Work with fractions
  - Add/subtract/multiply/divide/simplify
- Evaluate algebraic expressions using substitution
- Solving equations in one variable
  - One-step/Two-step/multi -step
- Knowledge of the number line and the Cartesian coordinate plane
  - Plotting points
  - Knowledge of points in relation to the quadrants
- Graphing linear equations
  - Slope intercept form:  $y = mx + b$
  - Standard form:  $ax + by = c$
  - Using x and y intercepts
- Basic perimeter and area formulas
- Set up and solve word problems
- Solve and graph absolute value
- Understand properties of inverse
  - Opposites/reciprocals
- Work with polynomials: Add/subtract/multiply (Distributive Property and FOIL)
- Work with formulas
  - Evaluating basic geometry formulas
  - Solving for a variable in a formula
- Properties of proportions
- Percents
- Use of the Pythagorean Theorem

## Procedural Checklist / Reference Sheet

### Number Sense & Operations

#### **Finding Percent of**

1. Change the percent to a decimal
2. Multiply the total amount by the decimal

#### **Changing Fractions to Decimals**

1. Divide the numerator by the denominator
2. Round to the nearest hundredth if needed

#### **Changing Fractions to Percent**

1. Divide the numerator by the denominator
2. Round to the nearest hundredth
3. Drop the decimal point
4. Add a percent sign

#### **Solving Multi-Step Operations -- PEMDAS**

1. Complete all computation inside the parenthesis, brackets, or absolute value
2. Carry out all exponents
3. Multiply or divide, from left to right
4. Add or subtract, from left to right

#### **Distribution**

1. Multiply the # or variable outside the parenthesis by each term inside the parenthesis
2. Check the signs (+/-)

#### **Multiplying Exponents vs. Dividing Exponents**

- |                      |  |                    |
|----------------------|--|--------------------|
| 1. Add exponents     |  | Subtract exponents |
| 2. Multiply integers |  | Divide integers    |

#### **Solving with Absolute Value**

1. Set up two equations
2. One with a positive answer
3. One with a negative answer
4. Solve each equation

#### **Multiplying by a Fraction**

1. Multiply the numerator by all values
2. Divide this product by the denominator

#### **Estimating the value of a Radical ( $\sqrt{\quad}$ )**

1. For a square root, find the closest square number.
2. Estimate the value ( higher/lower)
3. If it's a cube root, find the closest cube number
4. Estimate this value.

#### **Multiplying Binomials**

1. Use **FOIL** -- first, outside, inside, last

2. Use box method & combine like terms

### Patterns, Relations, and Algebra

#### **Solving Equations for One Variable**

1. Distribute
2. Combine Like Terms
3. Get all the variables on the left side (+/-)
4. Get all number values on the right side (+/-)
5. Divide both sides by the coefficient
6. Remember, whatever you do to one side, you must do to the other

#### **Using Proportional Relationships**

1. Determine the Part to Whole relationship
2. Write a ratio for the KNOWN part to whole
3. Determine the second ratio -- given/missing information
4. Set up a proportion with X representing missing value in the UNKNOWN ratio

#### **Properties of Proportions**

1. If  $\frac{a}{b} = \frac{c}{d}$ , then  $ad = bc$
2. product of the means = product of the extremes Cross multiply to solve for missing variable

#### **Ratios used in Proportional Relationships**

1. Part / Whole
2. Percent (%) / 100
3. # of degrees / 360
4. sample / total population
5. Part:Part

#### **Solving Systems of Equations w/ Substitution**

- 1) +/- the x term, move to the right side
- 2) ÷ by the coefficient of y (÷ by # with y)
- 3) Set the expressions equal to each other & solve for x.
- 4) Substitute x & solve for y.
- 5) Write solution as a coordinate pair (x, y).

#### **Using the Equation of a Line/Slope(m)**

$$y = mx + b \qquad m = \frac{y_2 - y_1}{x_2 - x_1}$$
$$y - y_1 = m(x - x_1)$$

Graphing: Begin with b, and move with m

Parallel Slopes:  $m_1 = m_2$

Perpendicular slopes:  $m_1 \cdot m_2 = -1$ ,  $m_1 = \frac{1}{-m_2}$

Name \_\_\_\_\_ Date \_\_\_\_\_

## **Review Problems:**

**Due: First day of Geometry class**

**\*NOTE: Show all of your work on a separate piece of paper. Your teacher may count this as a quiz grade, a homework grade, or they may give a quiz on this material at the beginning of the year. Don't forget to use the reference sheet on page 2. You should "Google" the topic if you are unsure how to complete the examples. Khanacademy.org has some good instructional videos. Good luck!**

*-The CRLS Math Department*

**Solve various types of equations.**

**Solve for x.**

1)  $3x = 39$

2)  $x + 5 = 3$

3)  $\frac{x}{2} = 7$

4)  $3x - 8 = 4$

5)  $-3x + 2 = -11$

6)  $13 = \frac{x}{2} - 1$

7)  $-4(2x + 8) = 4x - 2$

8)  $6x - 5 + 2x = 12x - 4$

9)  $x^2 = 30^2 + 40^2$

10)  $x^2 - 11 = 25$

**\*Note: Problems 9 and 10 have two solutions each**  
**Simplifying expressions.**

Simplify each of the following:

1)  $18 \div 3 * 2 + 1$

2)  $3(10 - 2)$

3)  $-3(4 - 6) + 5$

4)  $\frac{1}{2}(8 + 6 - 2)$

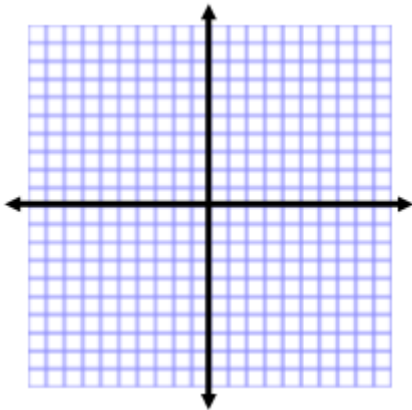
**Graph linear equations in various forms.**

Graph and check:

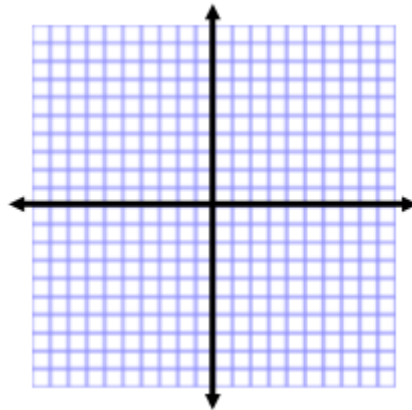
1)  $y = x + 2$

2)  $2x + 5y = -10$

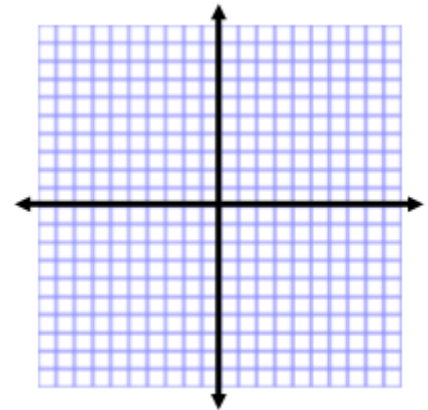
3)  $y + 1 = \frac{1}{2}(x - 4)$



1a) Does the point (20, 22) lie on this line?



2a) Does the point (5, -3) lie on this line?



3a) Does the point (206, 100) lie on this line?

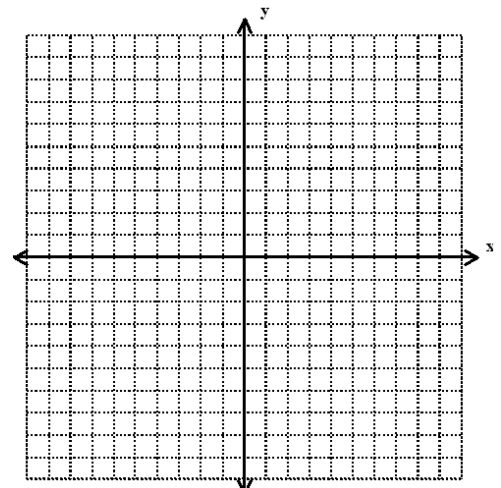
**Graphing coordinates**

Graph and label the following coordinates on the coordinate plane at the right.

A (4, -2)

B (7, 6)

C (-5, -8)



**D (-4, 6)**

## **Understand properties of inverses.**

**Simplify each of the following:**

1)  $6 \cdot \frac{1}{6} =$

2)  $-3x + 3x =$

3)  $\frac{7}{2} \cdot -\frac{2}{7} =$

## **Rounding**

**Round to the nearest tenth**

1) 1.5548

**Round to the nearest hundredth**

2) 1.5548

**Round to the nearest thousandth**

3) 1.5548

## **Properties of proportions.**

**Solve:**

1)  $\frac{x}{3} = \frac{30}{18}$

2)  $\frac{5}{12} = \frac{x}{24}$

3)  $\frac{x+1}{2} = \frac{35}{10}$

## Evaluating Expressions

Evaluate each of the following expressions.

Let  $x = 4$ ,  $y = -2$ , and  $z = 7$

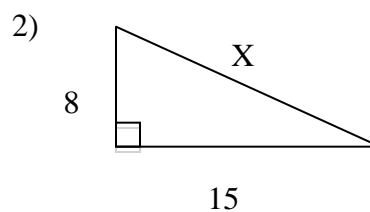
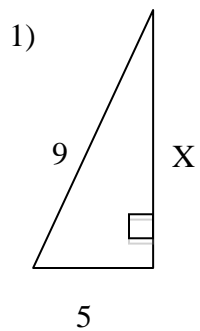
1)  $2x + 3y^2$

2)  $-5(x + y)$

3)  $\frac{-y}{x}$

## Use of the Pythagorean Theorem $a^2 + b^2 = c^2$

Find the missing side length. If needed, round to the nearest tenth



## Exponents and Radicals (the basics)

Simplify the following expressions without a calculator. Show your work

1)  $8^2 - 3^3 =$

2)  $\sqrt{8^2} =$

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

## Numeracy

Simplify the following expressions without a calculator. Show your work

1)  $-5 - 7 =$

2)  $8 - (-10) + 2 =$

3)  $8 + 100 - 20 =$

4)  $8 - (-40) =$

5)  $30 - 40 + 20 - (-5) =$

6)  $-70 - 80 =$

## Word Problem

Beau Thai has a rectangular mirror with a length of 6 inches and a width of 10 inches.

a) How much ribbon could Beau wrap around the outside of the mirror?

b) What is the area of Beau Thai's mirror?