

What students need to know for...
ALGEBRA I 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 Algebra I at Cambridge Rindge and Latin High School should demonstrate the ability to...

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:

- Comfort with fractions
 - Add, subtract, multiply, and divide
 - Equivalent fractions and reducing
- Solve various types of equations
 - One step/two step
- Arithmetic with positive and negative numbers
- Identify and combine like terms
- Graph an equation on a coordinate plane using a table
- Solve systems of equations and systems of inequalities
- Be familiar with exponents and exponential notation
- Students should be able to use Order of Operations
- Students should know rounding and place value
- Understand the difference between numbers and their reciprocals
 - (e.g. $\frac{1}{2} = \frac{1}{2}$ and **not 2**; 4 divided by 24 is not 6)
- Be able to evaluate an expression with a replacement set
- Convert numbers to scientific notation and back to standard form
- Identify functions using multiple representations
 - Table/equation/graphically
 - Linear/quadratic/absolute value
- Solve ratios and proportions
- Understand exponents and roots

Review Problems:

*NOTE: Show all of your work. 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

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) \div by the coefficient of y (\div 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: $m_1 \cdot m_2 = -1$, $m_1 = \frac{1}{-m_2}$

1. Write your answers in lowest terms.

a. $\frac{5}{8} + \frac{3}{4}$

b. $\frac{7}{16} - \frac{3}{8}$

Remember!

- to add and subtract fractions, you must find a common denominator
- to multiply fractions, multiply numerator by numerator and denominator by denominator
- to divide fractions, multiply by the reciprocal of the divisor

c. $\frac{5}{8} \cdot \frac{2}{3}$

d. $\frac{1}{4} \div \frac{3}{11}$

2. Write a percent for each fraction or decimal.

a. $\frac{59}{100} = \underline{\quad} \%$

b. $0.095 = \underline{\quad} \%$

3. Solve the following percent problems.

a. Find 6% of 3750

b. Find 15% of 200

4. Perform the indicated operations. Do not use a calculator.

Remember!

- The product or quotient of a positive number and a negative number is always negative.
- The product of two negative numbers is always positive.
- The quotient of two negative numbers is always positive.

a) $4 - 20$

b) $20 - 4$

c) $-4 + (-20)$

d) $4 - (-20)$

e) $20(-4)$

f) $-20 + (-4)$

g) $(-20)(-4)$

h) $20 + (-4)$

i) $-20 - 4$

j) $20 - (-4)$

k) $20 \div (-4)$

m) $-20 + 4$

n) $-20 \div (-4)$

o) $-20 \div 4$

5. Simplify each expression using the order of operations.

a. $-3 + 8 \div 2 + 7$

b. $3(12 - 4b)$

c. $-7 - \frac{1}{4}(4x - 4)$

d. $(2^3 - 3^2)(4^2 - 4^3)$

6. Evaluate each expression.

a. $3x - 9$ for $x = 3$

b. $y^2 \div z$ for $y = -14$ and $z = 4$

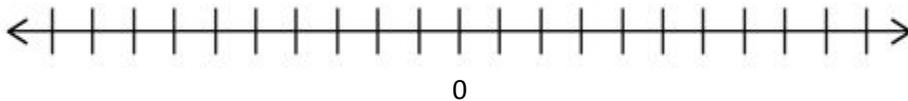
c. $|m| - |-2n|$ for $m = -11$ and $n = 8$

d. $\frac{a}{b}$ for $a = -\frac{3}{4}$ and $b = \frac{7}{8}$

e. $\frac{4 + 2d}{-2}$ for $d = -7$

7. Plot the given numbers on the number line shown. Label the number line with the letter.

0	3.5	-4	$4\frac{1}{4}$	-1.3	$-\frac{1}{2}$	1.75	$-2\frac{3}{4}$
A	B	C	D	E	F	G	H



8. Write an expression for each phrase:

a. 5 more than the product of 4 and m

b. 10 less than the difference of 6 and a number n

9. Find the mean of the following sets of numbers:

a. 2, 4, 6, 12, 7, 19

b. -3, 14, -3, 0, 2, -10

10. Solve the following equations for x .

a. $5x = 70$

b. $x - 2 = -4$

c. $12 = \frac{x}{2}$

d. $\frac{2}{3}x = 8$

e. $-4 - x = 5$

f. $\frac{x}{2} + 3 = -1$

11. For each table of values below, determine the pattern and complete the table by filling in the blanks.

x	y
-2	4
-1	7
0	
1	13
2	
3	19
4	
5	

x	y
-2	4
-1	1
0	0
1	1
2	
3	
4	
5	

x	y
-2	$\frac{1}{4}$
-1	$\frac{1}{2}$
0	1
1	2
2	
3	
4	
5	

12. Plot the following coordinate points on the graph. Label each point on the graph with the letter assigned to that point.

Remember!

In a coordinate point, the x is first, and the y is second:

$$(x, y)$$

A (0, 3)

B (-2, -4)

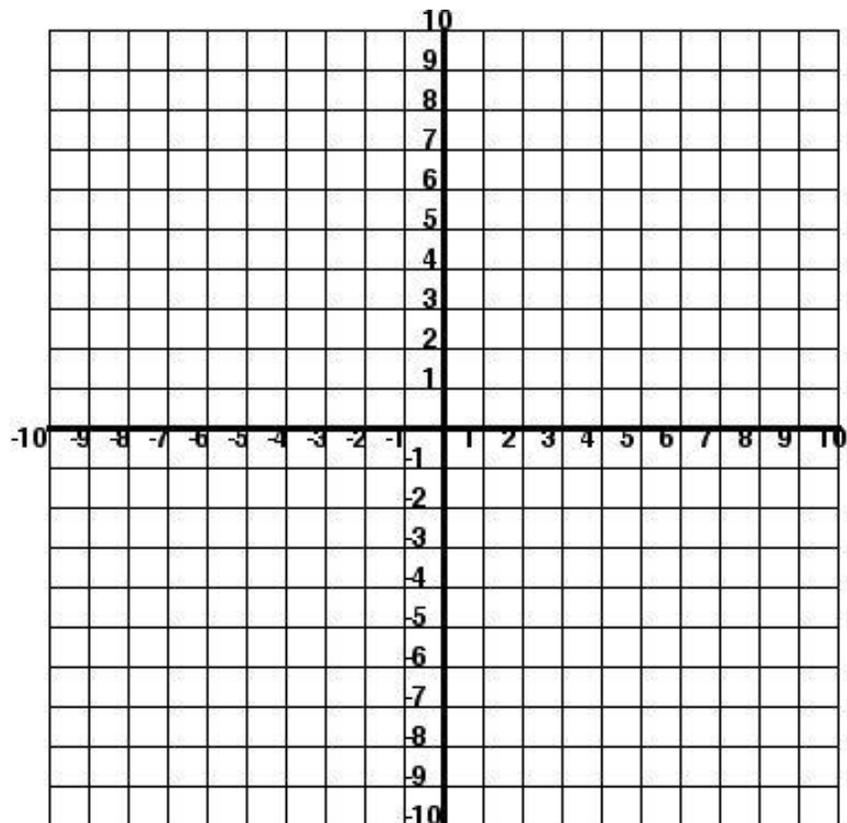
C (5, 7)

D (-4, 0)

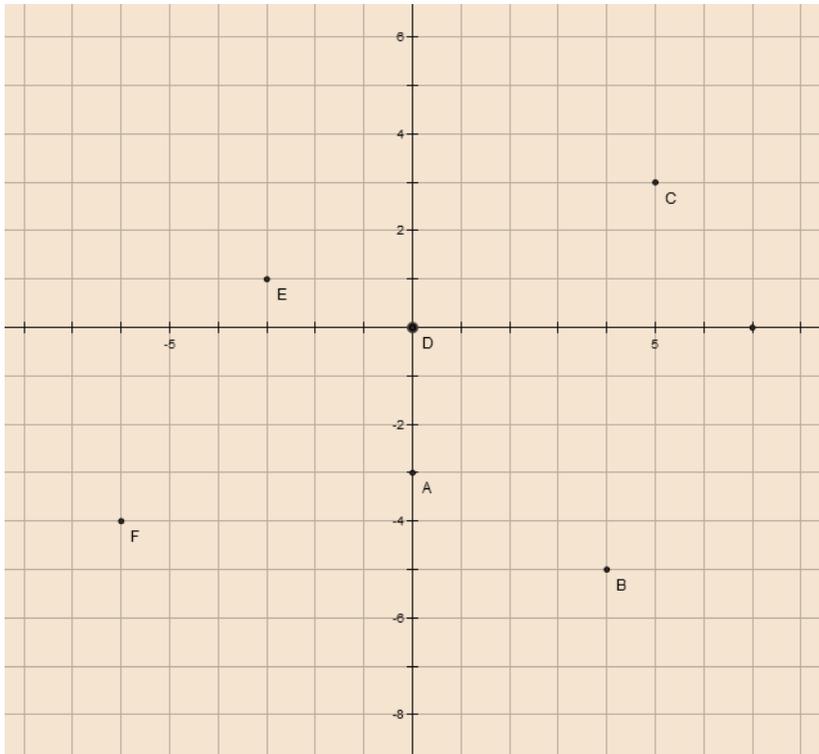
E (2, -4)

F (-4, 8)

G (-3, -2)



13. Determine the coordinates for each point plotted on the graph below.



- A _____
- B _____
- C _____
- D _____
- E _____
- F _____

14. $y = -\frac{1}{3}x + 2$

What is the slope? _____ What is the y-intercept? _____

Graph the equation:

