

Immaculate Heart Academy
Summer Math Assignment for
Algebra 2 Honors and Algebra 2/Pre-Calculus Honors
COURSE CODES (5330 and 5351)



You are taking **Algebra 2 Honors or Algebra 2/Pre-Calculus Honors** in the fall. A mastery of and proficiency in performing the following Algebra and Geometry skills will be necessary for success in this Algebra II Honors or Algebra II/Pre-Calculus **honors level course**. Referencing class notes from Algebra I Honors and Geometry Honors will be very helpful in doing the problems presented in this review. Work on each problem in order. Copy the problem onto loose-leaf paper **except where you are directed to show all work in the space provided or to present graphs**. Show all work in a neat and organized manner. Box in your final answer. Complete this entire assignment and bring it to class on the first day.

This assignment is mandatory and the math department strongly encourages you do this assignment on your own and to the best of your ability. Since the material contained in the summer math packet is *prerequisite material* you are responsible for having learned and retained. If you have forgotten any of these important mathematical concepts, you will find at the end of this assignment, several links to websites that you might find helpful should you have any problems or need some additional support on this assignment

At the end of this assignment are several links to websites that you might find helpful should you have any problems with your assignments.

I. Perform the indicated operation(s). You must find the LCD and simplify your answer. Do not use a calculator.

1. $\frac{3}{8} + \frac{5}{13}$

2. $\frac{7}{4} - \frac{1}{12}$

3. $\frac{2}{5} - \frac{1}{3} - \frac{1}{6}$

4. $\frac{8}{9} + \frac{2}{3} + \frac{1}{2}$

5. $\frac{1}{2} + \frac{1}{3} + \frac{1}{4}$

6. $\frac{9}{11} - \frac{5}{3} - \frac{5}{6}$

7. $-\frac{3}{12} + \frac{4}{10} - \frac{1}{5}$

8. $\frac{2}{8} - \frac{3}{4} + \frac{1}{2}$

9. $\frac{7}{15} - \frac{4}{5} + \frac{2}{3}$

10. $\frac{1}{2} - \frac{8}{10} + \frac{5}{4}$

11. $5\frac{1}{8} - 2\frac{3}{4}$

12. $4\frac{3}{8} - 2\frac{5}{6}$

13. $9\frac{2}{5} + 3\frac{1}{3}$

14. $2\frac{1}{20} + 3\frac{3}{8}$

II. Perform the indicated operation(s). Simplify the result. Do not use a calculator.

1. $\frac{3x}{8} \div \frac{1}{2}$

2. $8x \div \left(-\frac{1}{4}\right)$

3. $-24x \div \left(-\frac{2}{3}\right)$

4. $\frac{-22}{-\frac{1}{3}}$

5. $\frac{\frac{1}{2}}{\frac{3}{4}}$

6. $\frac{\frac{2}{3}}{\frac{3}{5}}$

7. $\frac{18x-9}{3}$

8. $\frac{22x+10}{2}$

9. $\frac{-56+x}{-8}$

10. $\frac{45-5x}{5}$

11. $\frac{22-4x}{4}$

12. $\frac{15x-7}{5}$

III. SLOPE

1. Identify the Slope Formula:

2. Use the slope formula to find the slope through the following pairs of points:

a. $(-2, 3)$ $(1, -5)$

b. $(-4, 1)$ $(6, 1)$

c. $\left(0, \frac{3}{2}\right)$ $\left(-9, \frac{17}{2}\right)$

d. $\left(6, \frac{1}{3}\right)$ $\left(6, \frac{2}{3}\right)$

3. Determine the value of “ y ” so the line passing through this pair of points has the given slope:

$$(-2, -3), (7, y); m = -\frac{1}{3}$$

4. Determine the slope of the graph of the linear function f , given:

$$f(3) = -1, f(-5) = -1.$$

IV – Writing Equations of lines. Use the point slope formula $y - y_1 = m(x - x_1)$ to write the equation of the line:

1. That passes through the points $\left(0, \frac{3}{2}\right)$ $\left(-9, \frac{17}{2}\right)$.

2. That is parallel to $y = 2x - 4$ and passes through the point $(-1, 5)$.

3. That is perpendicular to $y = -3x + 1$ and passes through the point $(-5, 2)$.

V. Use the points A (4, 1) and B (8, 3). Show all work in the space provided.

a) Present the graph of \overline{AB} .

b) Find the midpoint of \overline{AB}

Midpoint: _____

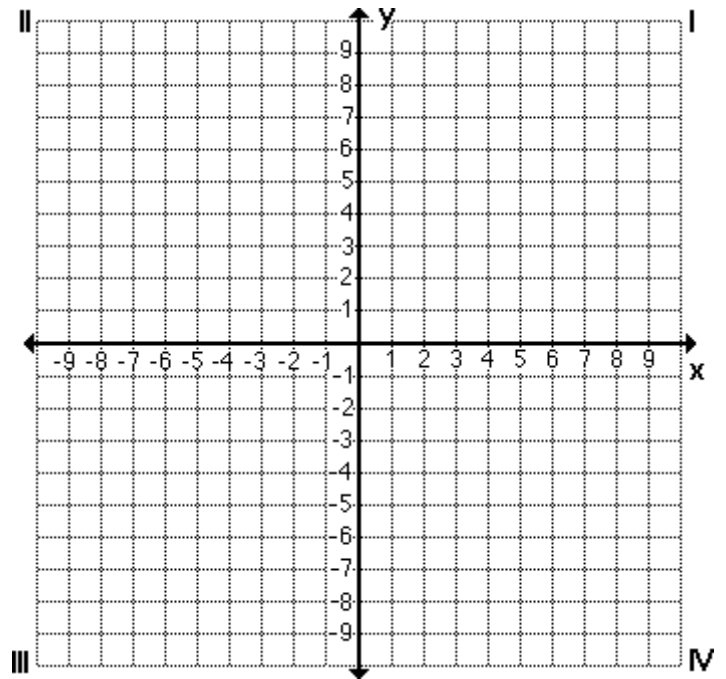
c) Find the slope of \overline{AB} using the Slope Formula. Confirm by box-counting.

Slope: _____

d) Determine the slope of the line **perpendicular** to \overline{AB} Ans.: _____

e) Write an equation of the line that is the **perpendicular bisector** of \overline{AB} in **point-slope** form, **slope-intercept** form and **standard** form.

f) Write the function whose graph is the line \overline{AB} . (Use correct mathematical notation)



Point-Slope Form: _____

Slope-Intercept Form: _____

Function: _____

VI. Rewrite Formulas

1. Solve the formula $I = prt$ for r .

2. Solve the formula $A = \frac{1}{2}bh$ for b .

3. Solve the formula $F = \frac{9}{5}c + 32$ for c

4. Solve the formula $P = 2l + 2w$ for w .

5. Solve the formula $A = \frac{1}{2}(b_1 + b_2)h$ for b_1

6. Solve the formula $C = 2\pi r$ for r .

7. Solve the formula $A = \pi r^2$ for r .

VII. GRAPHING. Show all work in the space provided.

1. Using the slope-intercept method,

GRAPH: $-4x - 5y = 15$

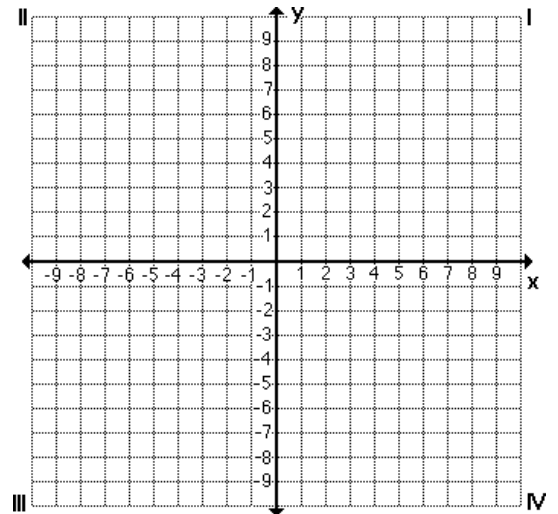
$m =$ _____ $b =$ _____ **y-intercept:** _____

Any line **parallel** to this line would have a slope of _____.

Any line **perpendicular** to this line would have a slope of _____.

Domain = _____ **Range =** _____

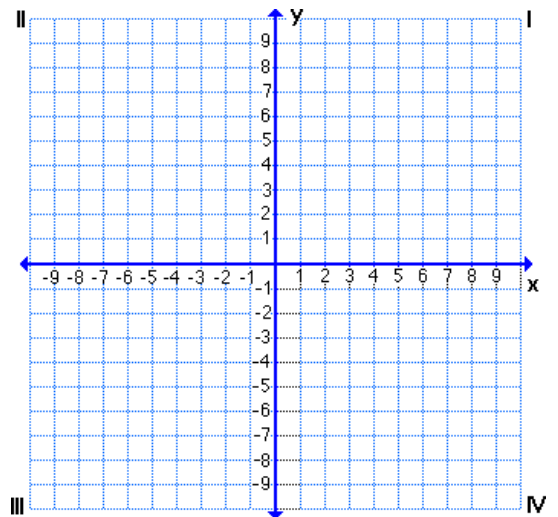
Define 3 points that lie on the graph of this function: _____, _____, and _____.



2. Given: $8x - 3y = -8$, graph using intercept points. *Be sure to demonstrate your procedure algebraically in the space below.*

x-intercept point: _____

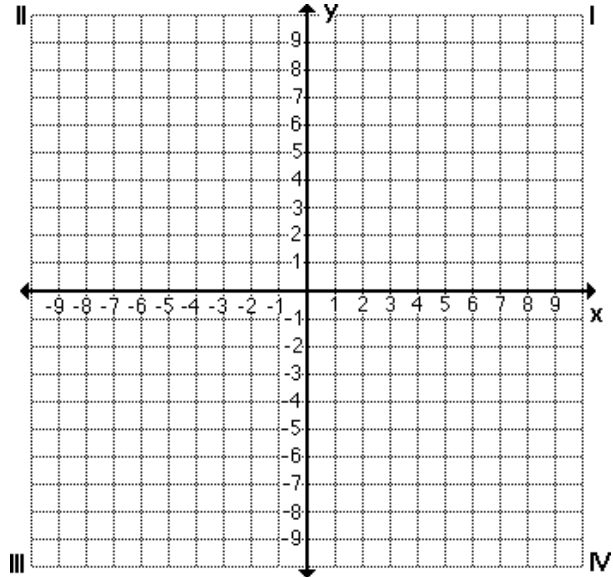
y-intercept point: _____



SOLVE this system graphically.

3. $15x - 10y = -80$

$$6x + 8y = -80$$



Solution: _____

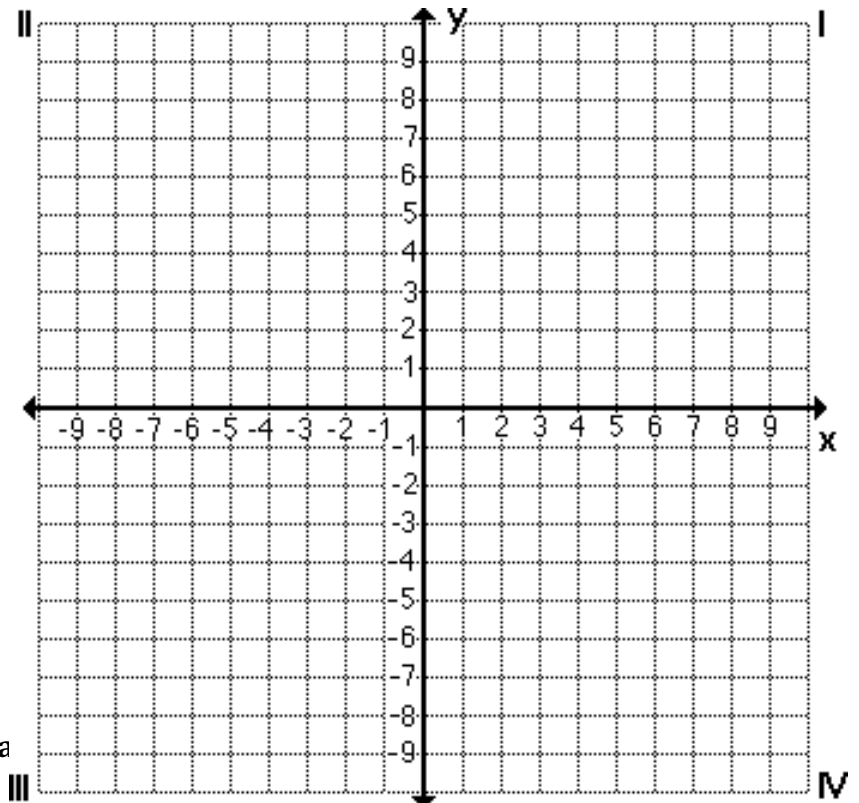
Confirm your solution by algebraic substitution.

4. **SOLVE** this system of linear inequalities graphically.

$$-2x + 5y < 5$$

$$x + 2y < 3$$

$$x < 4$$



VIII. SOLVE each of the following absolute value equations. **Be sure to check solutions.**

1. $3|4x + 2| - 7 = 11$

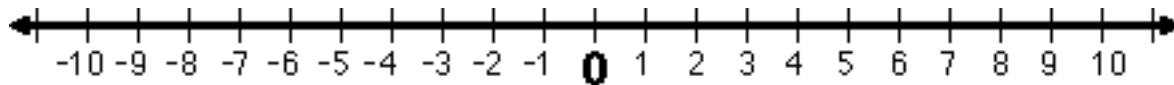
2. $3|2x - 8| + 3 = 2$

3. $|4x + 10| = 6x$

IX. Solve each of the following absolute value inequalities. Show all work below. Present

final results in *set-builder* notation and *interval* notation.

1. $2|3x + 8| - 13 < -5$



Set-builder Notation: _____

2. $\left| \frac{2}{5}x - 8 \right| + 4 \geq 12$



Set-builder Notation: _____

X. SIMPLIFY each expression - no negative exponents. Review the following Properties of Exponents:

Rule #1: Product of Powers $a^m \cdot a^n = a^{m+n}$

Rule #2: Power of a Power $(a^m)^n = a^{m \cdot n}$

Rule #3: Power of a Product $(a \cdot b)^m = a^m \cdot b^m$

Rule #4: Zero Exponent $a^0 = 1, a \neq 0$

Rule #5: Negative Exponent Rule $a^{-n} = \frac{1}{a^n}, a \neq 0$

Rule #6: Quotient of Powers $\frac{a^m}{a^n} = a^{m-n}, a \neq 0$

Rule #7: Power of a Quotient $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

1. $2^3 \cdot 2^4$

2. $(7)^2(7)^3$

3. $(12x)^3$

4. $-(4x)^2 \cdot (5x)^3$

5. $(7x^3y) \cdot (2x^4)$

6. $(4r^2s)^2(-2s^2)^3$

7. m^{-4}

8. $\frac{y}{x^{-2}}$

9. $\frac{3}{3x^{-4}y^3}$

10. $(-3t)^0 \cdot \frac{2}{s^{-2}}$

11. $\left(\frac{4b^{-1}}{2a^4}\right)^{-2}$

12. $\frac{2^{11}}{2^8}$

13. $\left(\frac{3x^2z^4}{2xa}\right)^3$

14. $\frac{18b^2c}{4bc^3} \cdot \frac{3ab^{-2}}{5a^2c^3}$

15. $\frac{4x^3y^5}{3x^2y^4} \cdot \frac{9x^3y^2}{12xy}$

XI. FACTOR completely – remember to first present polynomial expression in *standard form* and when leading coefficient is negative to factor out a negative. Write prime if the expression is not factorable.

1. $y^2 + 3y - 4$

2. $n^2 + 16n - 57$

3. $x^2 + 17x + 66$

4. $-z^2 + 14z - 45$

5. $12b^2 - 17b - 99$

6. $2t^2 + 17t + 66$

7. $18d^2 - 54d + 28$

8. $4n^2 + 4n - 288$

9. $a^2 - b^2$

10. $4x^2 - 9$

11. $169 - x^2$

12. $25x^2 - 49y^2$

13. $-x^2 + 5x + 6$

14. $x^2 + 25$

15. $3x^2 - 7x - 6$

XII. SOLVE. Remember, if a quadratic equation cannot be solved by factoring, you may solve it by using the Quadratic Formula or by completing the square.

1. $(2x - 3)(x + 7) = 0$

2. $5(x + 3)(2x - 5) = 0$

3. $x^2 - x - 2 = 0$

4. $x^2 + 7x + 10 = 0$

5. $x^2 - 9x = -14$

6. $2x^2 - 9x - 35 = 0$

7. $7x^2 - 10x + 3 = 0$

8. $2x^2 + 19x = -24$

9. $10x^2 + x - 10 = -2x + 8$

10. $\frac{x}{3} - \frac{x}{5} = 3$

11. $-\frac{3}{8}y = 6$

12. $-\frac{4}{9}(2x - 4) = 48$

13. $-(8h - 2) = 3 + 10(1 - 3h)$

14. $-2x^2 + 5x = 3x^2 - 10x$

15. $-9x^2 + 35x - 30 = 1 - x$

16. $6x^2 - 8x + 3 = 0$

17. $8x^2 + 4x + 5 = 0$

18. $3(x - 1)^2 = 4x + 2$

XIII. Real World Applications. All work should be done in the space provided below each problem.

A. Modeling with mathematical functions:

For each write a verbal model that describes the given scenario, label each unknown and then write an algebraic function that will model the information in each problem. Use the function and/or write an equation that you will use to answer each question. Answer each question using a complete sentence in correct units.

1. In outer space, the distance an object travels varies directly with the amount of time that it travels. An asteroid travels 3000 miles in 6 hours.

Verbal Model:

“Let” Statement(s):

Algebraic Model:

Demonstrate the use of this model to determine the distance traveled by an asteroid after 10 hours.

2. A climber is on a hike. After 2 hours, he is at an altitude of 400 feet. After 6 hours, he is at an altitude of 700 feet. What is his average rate of change in feet per hour?

Verbal Model:

“Let” Statement(s):

Algebraic Model:

At this rate determine the climber’s altitude at the end of 2 additional hours.

3. A room’s length is 3 feet less than twice its width. The area of the room is 135 square feet. What are the room’s dimensions? Be sure to include labeled sketch, “let” statements, equation, and neatly executed solution.

XIV. Write in simplest form. No decimal answers are allowed.

1. $\sqrt{32}$

2. $\sqrt{56}$

3. $\sqrt{15} \cdot \sqrt{3}$

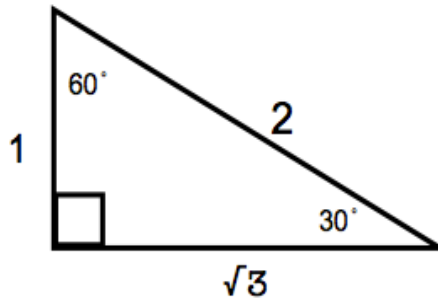
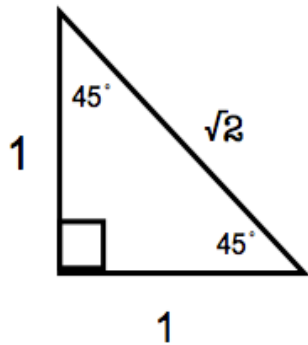
4. $3\sqrt{27}$

5. $\sqrt{15} \cdot \sqrt{3}$

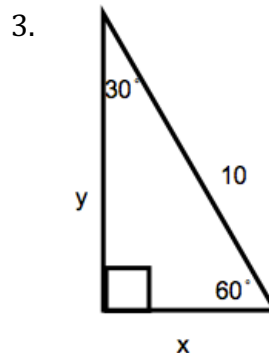
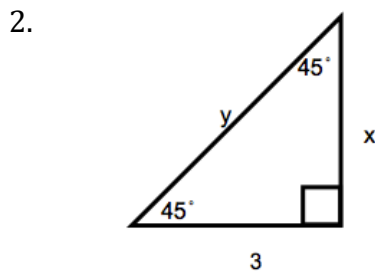
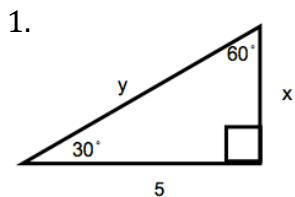
6. $\sqrt{\frac{16}{25}}$

XV. Review of Right Triangle Trigonometry:

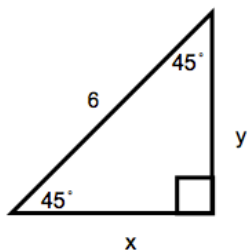
Based on the ratios of $30^\circ - 60^\circ - 90^\circ$ and $45^\circ - 45^\circ - 90^\circ$ triangles and definitions of $\sin \theta$, $\cos \theta$, $\tan \theta$, $\csc \theta$, $\sec \theta$ and $\cot \theta$, solve each of the following triangles. Simplify your answers. Rationalize the denominator. No decimal answers.



Solve for x and y:

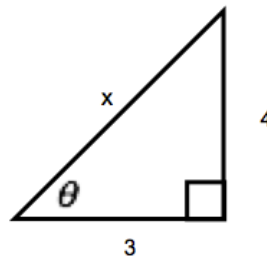


4.



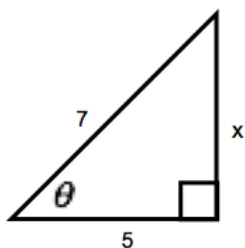
5. a) Solve for x

b) Find the trigonometric ratios:
 $\sin \theta, \cos \theta, \tan \theta$



6. a) Solve for x

b) Find the 3 trigonometric ratios: $\sin \theta, \cos \theta, \tan \theta$



Helpful websites:

1. <http://www.purplemath.com>
2. <http://www.khanacademy.org/>
3. <http://www.algebra-class.com/>
4. <http://www.themathpage.com/alg/algebra.htm>