



**Pensacola Catholic High School**  
**Math Department**  
**Summer Packet | For Students Entering Pre-Calculus Honors**

Dear Parent/Guardian and Student,

The Math Department at Pensacola Catholic High will require the completion of a summer packet for each student entering an Honors math course. The problems on this packet are due the second day of Math class (Tuesday, August 10th or Wednesday, August 11th depending on your course schedule). The packet has two purposes: (1) to help you retain the math knowledge you've gained in your previous math classes, and (2) to get a sense of what we expect you to know going into your next class. Here are some tips for working through the packet:

1. We encourage you to work on this packet throughout the summer rather than doing the entire packet at the start or end of the summer. That way you keep the topics you learned fresh in your mind. Do not wait until the last minute to complete this packet!
2. You should complete every problem on the packet and show your work on each problem. Use extra paper if absolutely needed, clearly identifying each problem. All work should be neat, complete, and organized. No problem should be left blank, and no work means no credit.
3. You should not feel obligated to hire an outside tutor. We will spend the first week reviewing material that is necessary. However, you will be tested at the end of the first week on all material in the packet. If you are struggling with the packet, there are free resources, like Khan Academy, that can help.
4. Calculators are allowed for the completion of this packet, but please do not rely on your calculator for the answer. Your assessment will be taken without a calculator.
5. This packet will be graded for correctness and will be one of the first grades of Quarter 1.

Enjoy your Summer and Best of Luck!!  
Mrs. Gottstine

## TOPIC 1: OPERATIONS WITH NUMERIC AND ALGEBRAIC FRACTIONS

1. Reduce:  $\frac{abxy}{15bx}$
2. Find a rational expression equivalent to  $\frac{x+6}{x-5}$  but with a denominator of  $(x+1)(x-5)$
3. Rewrite these fractions using the lowest common denominator:  $\frac{1}{3y}$  and  $\frac{-5}{y-1}$
4. Find the sum (reduce if possible):  $\frac{2x}{y-2} + \frac{2x}{2-y}$
5. Find the difference (reduce if possible):  $\frac{5}{y-5} - \frac{y}{y-5}$
6. Multiply (reduce if possible):  $\frac{4(x-2)}{3y^3} \cdot \frac{6y}{x^2-4}$
7. Divide (reduce if possible):  $\frac{\frac{x+5}{x^2-16}}{\frac{1}{x+4}}$

8. Divide (reduce if possible):  $\frac{a+2}{\frac{2}{a}+1}$

9. Multiply (reduce if possible):  $\frac{a^2-b^2}{(r+2)^2} \cdot \frac{(r+2)}{(x+y)^2} \cdot \frac{(x+y)^3}{(a-b)^2}$

10. Find the difference (reduce if possible):  $\frac{c-d}{c+d} - \frac{c+2d}{d+c}$

## TOPIC 2: OPERATIONS WITH EXPONENTS AND RADICALS

1. Find the value of:  $-5^2$
2. Find the value of  $\sqrt{(-3)^2}$
3. Solve for  $x$ :  $b^5 \cdot b = b^x$
4. Find the value of:  $\frac{9^x}{3^{x-2}}$
5. Rewrite with positive exponents only:  $\frac{x^3 \cdot y^{-2} \cdot z}{x^{-2} \cdot y \cdot z^2}$
6. Rewrite with no fraction:  $\frac{x^3 \cdot y^{-2} \cdot z}{x^{-2} \cdot y \cdot z^2}$
7. Rewrite using radical form:  $2y^{\frac{3}{2}}$
8. Rewrite using fractional exponents:  $\frac{1}{\sqrt{x^3}}$
9. Simplify:  $3\sqrt{2} + \sqrt{8} - \sqrt{128}$
10. Rationalize the denominator:  $\frac{\sqrt{5}}{1+\sqrt{5}}$

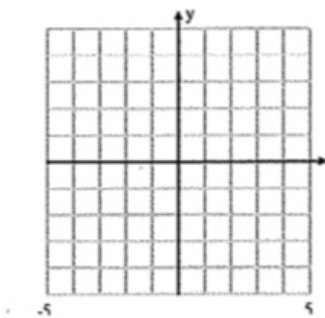
### TOPIC 3: LINEAR EQUATIONS AND INEQUALITIES

1. Solve:  $\frac{2x-4}{x+6} = -\frac{2}{15}$

2. Solve for the common solutions by substitution or linear combinations, stating whether the lines are parallel, perpendicular, intersecting but not perpendicular, or the same line:  
 $x - y = 5$  and  $2x - y = -1$

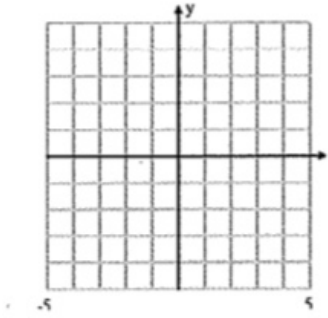
3. Solve for the common solutions by substitution or linear combinations, stating whether the lines are parallel, perpendicular, intersecting but not perpendicular, or the same line:  
 $2x - y = 3$  and  $4x = 6 + 2y$

4. Find the slope and y-intercept of  $3x - 2y = 6$  and sketch its graph

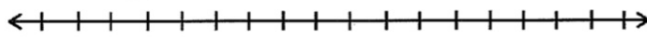


5. Find the equation of the line through  $(-3, -5)$  and  $(2, -2)$

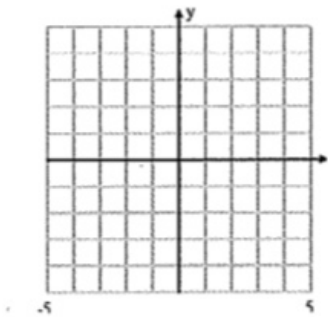
6. Graph and write an equation for the vertical line through the point  $(-2, 3)$



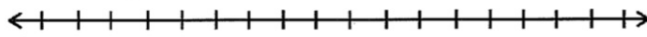
7. Solve and graph on a number line:  $-2x + 3 < 9$



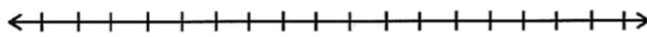
8. Graph:  $2x - 3y < 12$



9. Solve and graph on a number line:  $|3 - 5x| = 2$



10. Solve and graph on a number line:  $|1 - 2x| \geq 7$



TOPIC 4: POLYNOMIALS AND POLYNOMIA EQUATIONS

1. Solve by factoring:  $6x^2 = 3x$

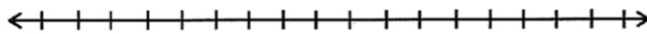
2. Solve by factoring:  $6x^2 - 6 = -5x$

3. Factor:  $m^3n^2 - mn^2 + m^2n^4$

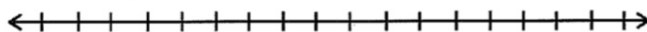
4. Find the polynomial,  $P$ , which completes the equation:  
 $(2y - 3)(3y^2 + 1) - (2y - 3)^2(y - 1) = (2y - 3)(P)$

5. Solve:  $2x^2 - 2x = 5$

6. Solve and graph on a number line:  $2x^2 + 11x \geq 21$

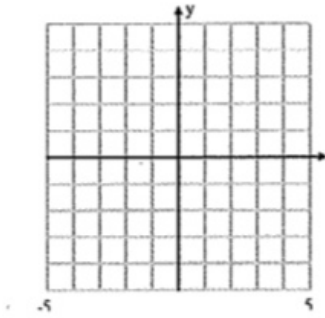


7. Solve and graph on a number line:  $6x^2 < 3x$

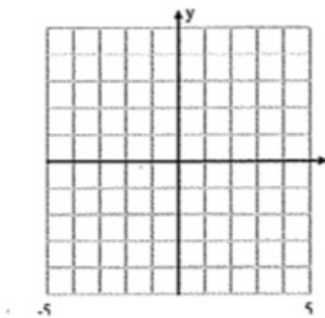


8. Complete the square and then factor completely:  $3x^2 + 9x + \underline{\hspace{1cm}}$

9. Sketch the graph:  $y = -(x - 1)(x + 3)$



10. Sketch the graph:  $y = (x - 1)^2 + 3$





## TOPIC 5: FUNCTIONS

1. Identify if the set of ordered pairs  $\{(1,2), (3,2), (4, 3), (5,4)\}$  is a function

2. Identify if  $y$  is a function of  $x$  given  $x = -y^2 + 2y + 1$

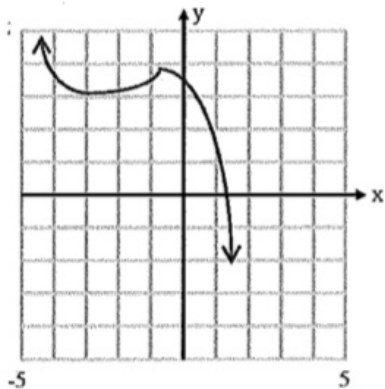
3. Given  $y = f(x) = -5x + 7$ , complete the ordered pair  $(\underline{\quad}, -8)$

4. Given  $f(x) = \frac{x^2}{1-x}$ , find  $f(-2)$

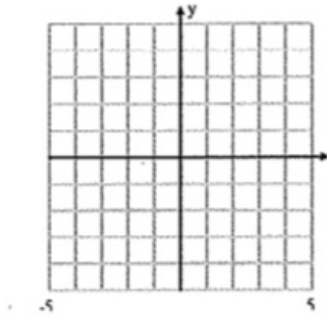
5. Given  $f(x) = 2x^2$  and  $g(x) = +1$  find  $f(g(x))$

6. Given  $f(x) = x^2 + 3x$ , find  $x$  so that  $f(x) = 4$

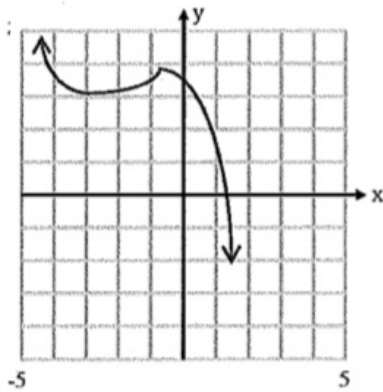
7. Identify if the following graphed relation a function:



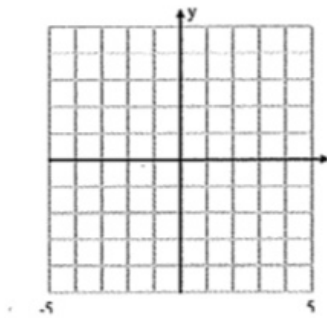
8. Graph  $f(x) = -x^2$



9. From the graph shown for  $f(x)$ , identify if the statement " $f(-3) > f(1)$ " is a true or false statement



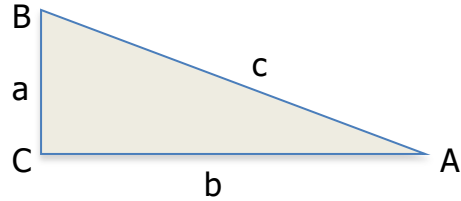
10. Graph  $f(x) = -|x - 1|$



## TOPIC 6: ALGEBRAIC AND GEOMETRIC CONCEPTS

- Find the distance between the following points:
  - $(-4, 2), (7, -4)$
  
  
  
  
  
  
  
  
  
  
  - $(3, 7), (-1, 2)$
  
- Find the midpoints of the line segments joining the following points:
  - $(-4, 2), (7, -4)$
  
  
  
  
  
  
  
  
  
  
  - $(3, 7), (-1, 2)$
  
- Find the equation of the line (in standard form) that passes through the following points:
  - $(-4, 2), (7, -4)$
  
  
  
  
  
  
  
  
  
  
  - $(3, 7), (-1, 2)$
  
- Find the equation of the line (in standard form) that is *perpendicular* to the line that passes through the following points and contains the coordinate  $(2, 2)$ :
  - $(-4, 2), (7, -4)$
  
  
  
  
  
  
  
  
  
  
  - $(3, 7), (-1, 2)$

For problems 5-8, uses  $\triangle ABC$  to the right as reference.



5. If  $C = 90^\circ$ ,  $a = 3$  cm,  $b = 4$  cm, and  $c = 5$  cm  
a. Identify  $\sin A$ .

b. Identify  $\cos A$ .

c. Identify  $\tan A$ .

6. If  $C = 90^\circ$ ,  $a = 3$  cm,  $b = 4$  cm, and  $c = 5$  cm  
a. Solve for the measure of  $A$ .

b. Solve for the measure of  $B$ .

7. If  $C = 90^\circ$ ,  $a = 5$  cm, and  $b = 12$  cm, find the measure of  $c$

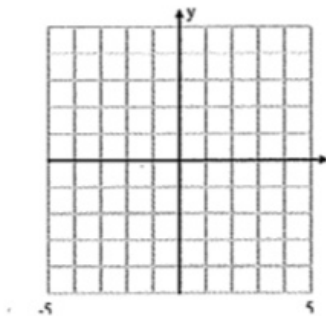
8. If  $C = 90^\circ$ ,  $a = 9$  cm, and  $c = 15$  cm, find the measure of  $b$

9. Draw a picture of a  $30^\circ$ - $60^\circ$ - $90^\circ$  triangle and label the length of the missing sides if the measure of the hypotenuse is  $x$

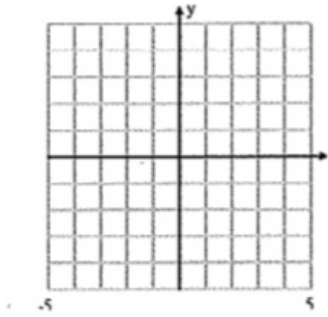
10. Draw a picture of a  $45^\circ$ - $45^\circ$ - $90^\circ$  triangle and label the lengths of the missing sides if the measure of the hypotenuse is  $x$

## TOPIC 7: LOGARITHMIC AND EXPONENTIAL FUNCTIONS

1. Given that the power of  $x$  which gives  $x^4$  is 4, rewrite as a logarithm
2. Given the equation  $(3)^2 = 3^x$ , solve for  $x$
3. Given the equation  $4\log_2 2 = \log_2 x$ , solve for  $x$
4. Find the value of  $\frac{15^4}{5^4}$
5. Find the value of  $\log_{125} 5$
6. Solve for  $x$  in terms of  $y$  given:  $2y = \frac{4^x}{4^y}$
7. Solve for  $x$  in terms of  $y$  given:  $3 \log x = \log x + 4 \log y$
8. Find the inverse of  $f(x) = -2x + 4$  and graph both it and its inverse



9. Graph  $y = 2^{-x}$



10. Graph  $y = -\log_2(x - 1)$

