Pensacola Catholic High School
Math Department
Summer Packet | For Students Entering Geometry 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. Green

1. Solve the following for the variable:
You should know how to solve equations with fractions as well as proportions.

a. $2p+5=13$

b. $3u+(u-2)=10$

c. $180-x=3(90-x)$

d. $\frac{1}{2}(x-7)=-8$

e. $\frac{2}{3}x+\frac{1}{2}x=\frac{3}{4}$

f. $\frac{3}{5}=\frac{q}{20}$

g. $\frac{y+7}{y}=\frac{2}{3}$

h. $12=\frac{6\cdot H}{2}$

i. $\frac{6+x}{2}\cdot 10=70$

j. $x^2=64$

k. $3(x^2-4)=15$

l. $100\pi=\pi r^2$

2. Use the distributive property to multiply the following expressions:
(Write your answer in descending degree…this is called the standard form for polynomials.)
You need to be able to simplify expressions, especially binomials.

a. $(x+3)(x-7)$

b. $y\left(3y^2-5y-10\right)$

c. $(x+4)(x+4)$

d. $\left(x+4\right)^2$ (Hint: NOT x^2+16)

e. $(2x-3)^2$

f. $\left(2x^2-3x\right)\left(-4x^2+5\right)$

3. Factor the following polynomials:
You need to be able to factor all different forms explicitly focusing on quadratics.

a. $9x^2-x$

b. $8x^5-32x^3$

c. $x^2+7x+12$

d. $x^2+7x-60$

e. $x^2-10x+25$

f. x^2-81

g. x^2-49

h. $2x^2+3x-9$

i. $4n^2-15n-25$

4. Solve the following by factoring and the zero product property:
You need to be able to solve equations by factoring

a. $(x-3)(8x+5)=0$

b. $x^2+14x+13=0$

c. $x^2+7x=8$
Hint: Not In Standard Form

d. $x^2+5x+12=-2x$

e. $2x^2-14x+40=x^2-9$

f. $2x^2+26x+72=0$

g. $3x^2-11x+10=0$

h. $3x^2-20x-60=x^2+x+5$

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

5. Simplify the following fractions (you may have to think about factoring…)

a. $\frac{5x-10}{15}$

b. $\frac{x+6}{x^2-36}$

c. $\frac{3x^2-6x-24}{3x^2+2x-8}$

6. Solve the following systems algebraically and show your work.
You need to be able to solve systems using substitution and elimination methods.

a. $\begin{cases} y=2x+11 \\ y=-x+5 \end{cases}$

b. $\begin{cases} 3x+2y=17 \\ 3x-2y=-5 \end{cases}$

c. $\begin{cases} 2x+4y=2 \\ x=y+7 \end{cases}$

d. $\begin{cases} -2x+5y=26 \\ 3x-2y=5 \end{cases}$

e. $\begin{cases} 4(x-3y)=0 \\ 2(x-5y)=0 \end{cases}$

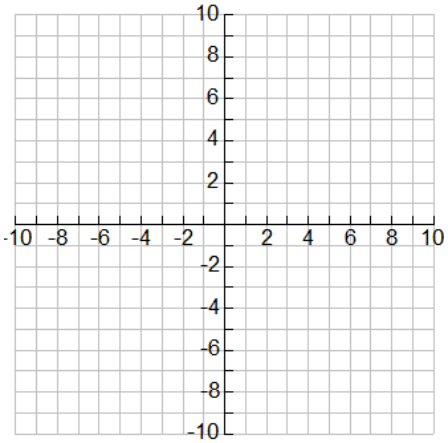
f. $\begin{cases} 3x-2y=5 \\ \frac{1}{2}y-1=-6x \end{cases}$

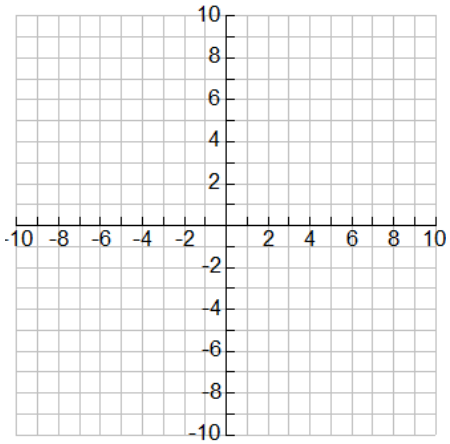
7. Graph the following on the grids provided by using at least two points and a straight line:
You need to be able to graph lines in various forms.

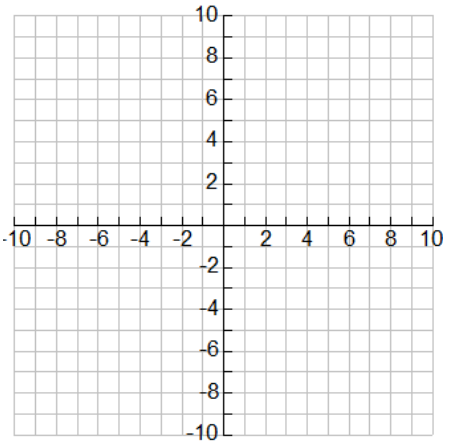
a. $y=\frac{2}{3}x-5$
(This is slope-intercept form)

b. $3x-8y=-24$
(This is standard form)

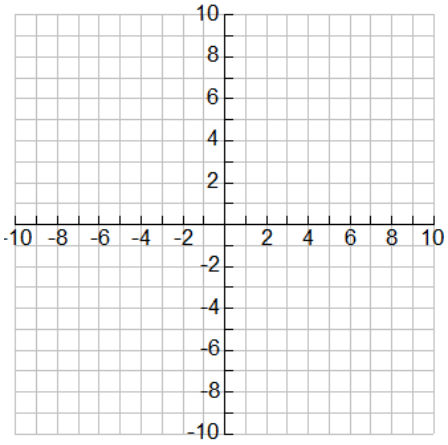
c. $y-4=-2(x+4)$
(This is point-slope form)



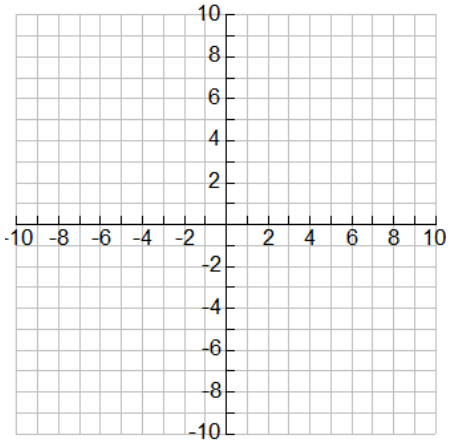




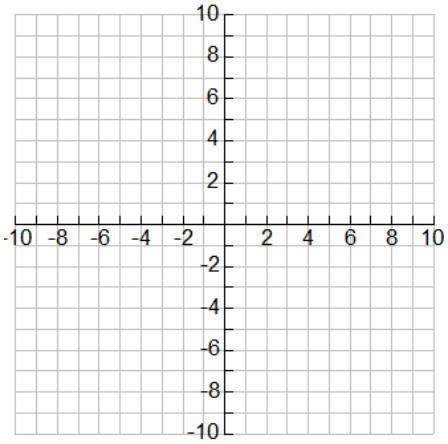
d. $x = 5$



e. $y = -7$



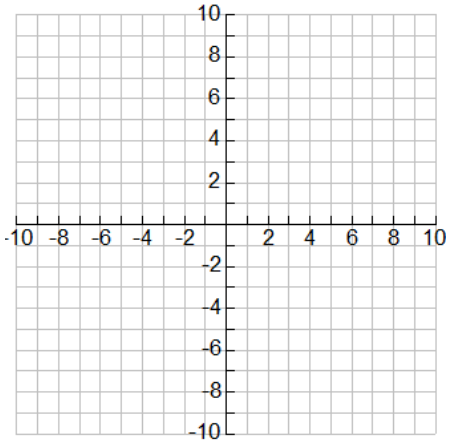
f. $y - 9 = 4(x - 2)$



8. Find the solution to the following systems by graphing:

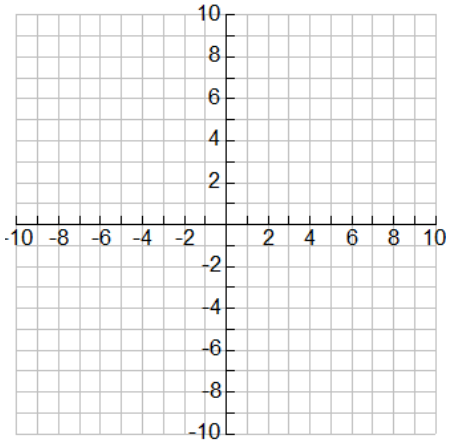
You need to be able to solve systems by graphing in addition to the algebraic methods you already practiced

a. $\begin{cases} y = -4x + 5 \\ y = \frac{5}{2}x - 8 \end{cases}$



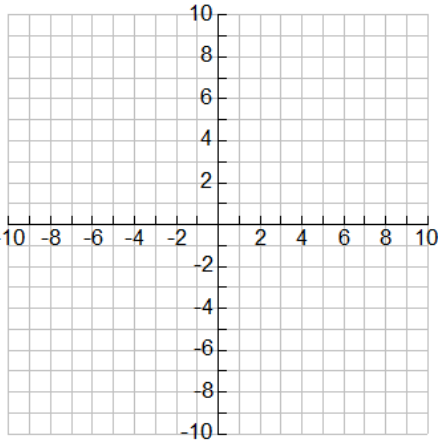
Solution: (_____ , _____)

b. $\begin{cases} x = -4 \\ y = 6 \\ y = -\frac{3}{2}x \end{cases}$



Solution: (_____ , _____)

c. $\begin{cases} 2y - 4 = x \\ x = 4y \end{cases}$



Solution: (_____ , _____)

9-11. Write equations of lines through the specified form.
You need to be able to write equations of lines given various information.

9. Write an equation of a line in slope-intercept form $y = mx + b$ for the following:

a. The slope of the line is -3 and the y-intercept is 5.

b. The line goes through the points (3, 1) and (0, 7). *Note: Question 15 has a formula you may need*

c. The lines that is parallel to $y = 5x - 4$ and goes through the point (7, -3).

10. Write an equation of a line in point-slope form $y - y_1 = m(x - x_1)$ for the following:

a. The slope of the line is 7 and it goes through the point (2, 3).

b. The line goes through the points (2, -7) and (-4, 9).

c. The line that is perpendicular to $y = -\frac{1}{3}x + 8$ and goes through the point (-8, -2).

11. Use any form you want for the following:

a. Write an equation of a vertical line through the point (4, -5).

b. Write an equation of a horizontal line through the point (4, -5).

c. Write an equation of a line with an undefined slope through the point (4, -5).

d. Write an equation of a line with a zero slope through the point (4, -5).

e. Write an equation of a line perpendicular to $6x - 4y = 12$ and through the point (7, -5).

12. Simplify the following radicals:

You should know how to perform operations (adding, subtracting, multiplying, & dividing) with radicals.

a. $\sqrt{25}$

b. $\sqrt{24}$

c. $\sqrt{108}$

d. $3\sqrt{49}$

e. $5\sqrt{18}$

f. $2\sqrt{50}$

g. $\sqrt{27}+4\sqrt{75}$

h. $9\sqrt{20}-3\sqrt{45}$

i. $7\sqrt{24}-\sqrt{48}+3\sqrt{54}$

j. $\sqrt{3}\cdot\sqrt{4}$

k. $\sqrt{8}\cdot\sqrt{6}$

l. $2\sqrt{3}\cdot\sqrt{3}$

m. $4\sqrt{5}\cdot 2\sqrt{5}$

n. $8\sqrt{3}\cdot 4\sqrt{8}$

o. $7\sqrt{3}\cdot 7\sqrt{3}$

p. $\left(7\sqrt{3}\right)^2$

q. $(3\sqrt{5})^2$

r. $\dfrac{15}{\sqrt{3}}$ *Note: You rationalize the denominator here*

s. $\dfrac{14}{\sqrt{2}}$

t. $\dfrac{19}{\sqrt{3}}$

u. $\dfrac{7\sqrt{10}}{\sqrt{2}}$

13. Evaluate each of the expressions below:

a. $2ab$ when $a = -3$ and $b = -4$

b. πrl when $r = \frac{11}{3}$ and $l = 6$

c. $x^2 - y^2$ when $x = 2\sqrt{3}$ and $y = -4$

d. $\frac{1}{3}\pi r^2 h$ when $r = 2\sqrt{6}$ and $h = 4$

14. Find the distance between the numbers on the number lines below.

a.

b.

c. The distance between two points on a number line is 8. One of the numbers is at -3. Find *all* possibilities for the location of the other number. (Hint: Draw a picture)

15. For the following pairs of points find the following:
   a. The distance between them
   b. The coordinate of the midpoint between them
   c. The slope of the line on which they lie

Remember that for any points (x_1, y_1) and (x_2, y_2) the following formulas are true:

Distance $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ Coordinate of Midpoint $= \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$ Slope $= \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Note: These are equations that you should have memorized and know how to use

Pair 1: (3, 4) and (15, 20)

Pair 2: (-2, 6) and (7, 0)