Notre Dame High School
Math Department

Honors Geometry

Summer Packet

The problems in this packet are designed to help you review Algebra 1 & 2 topics that are important to your success in Geometry. To help you retain and sharpen your Algebra skills, you are required to review the material and complete the problems in this packet.

Show all your steps when solving these problems. Additional sheets of loose-leaf paper may be attached to the packet if you need more space to show your work. (If you use additional sheets please number all problems clearly.)

You will be quizzed on this material during the first week of class, and your score will be included in your first marking period grade. No significant class time will be spent reviewing this material. During the first week of the semester, your teacher will offer assistance during Activity Period for any students that had trouble completing the packet. Attendance is optional, so if you are comfortable with the work, there is no need to attend. If you choose to come for assistance, please come prepared with questions.

You should be able to complete this packet without the aid of a calculator. You *will* need a calculator throughout the course.

Bring your completed packet with you on the first day of class (either the 1st or 2nd semester) so we can immediately begin a fun and challenging semester! We look forward to seeing you next year.

Enjoy your summer!

Geometry Summer Packet **Name ___________________________________**

A. Simplify these expressions. The expectation is that you can do these without a calculator.

1. $-3 + (-8) + 12 =$	2. $\frac{12}{-\frac{4}{9}} =$	3. $(8)(-6)(-1) =$	4. $\frac{11}{30} \div (-5) =$
5. $-5/6 - 5/9 =$	6. $3/4 + 1/6 - 5/8 =$	7. $\left(\frac{-3}{8}\right)\left(\frac{-4}{15}\right) =$	8. $(-2)(-2)^2 =$
9. $10 \cdot 4^2 - 15 =$	10. $\left(\frac{2}{3}\right)^2 + \left(\frac{5}{7}\right)^2 =$	11. $(8^2 - 3 \cdot 6) + 7^2 \div (6+1) =$	12. $-14^2 =$
13. $(-15)^2 =$	14. $4\sqrt{3} \cdot 3\sqrt{12} =$	15. $\sqrt{7}^2 =$	16. $\sqrt{3} \div \sqrt{8} =$
17. $\sqrt{\frac{1}{2}} =$	18. $\sqrt{28} + 2\sqrt{32} =$	19. $\sqrt{27}^2 + (3\sqrt{2})^2 =$	20. $\sqrt[3]{16} =$

B. Solving Equations

1. $7a - 5 = 2a - 20$	2. $-x + 4 = -3x - 16$	3. $5b + 2(3b + 1) = 3b + 5$
4. $5[2 - (2x - 4)] = 2(5 - 3x)$	5. $\frac{9}{x+2} = \frac{3}{x-2}$	6. $\frac{2}{x-1} = \frac{6}{2x+1}$

7. $\dfrac{2}{x+4}=\dfrac{x+5}{3}$	8. $-\frac{t}{4}=4$	9. $16=\frac{v}{10}-2$
10. $c^2+2c-60=3$	11. $x^2-11x=-18$	12. $x^2-79=2$
13. $3x^2-24x=27$	14. $\sqrt{x-8}-3=3$	15. $\sqrt{2-x}=2-x$

Write the equation and solve:

17. The difference between twelve and the product of five and a number equals seven. Find the number.

18. Twenty is two minus the product of six and a number. Find the number.

19. Three times the sum of a number and four is fifteen. Find the number.

20. The sum of the numbers is sixteen. The difference between four times the smaller number and two is two more than twice the larger number. Find the two numbers.

21. Four times the difference between three times a number and one is equal to six more than twice the number. Find the number.

C. Solving Literal Equations: Solve each equation for the indicated variable.

1. $E=mc^2$ $\quad c=$	2. $C=\frac{5}{9}(F-32)$ $\quad F=$	3. $P=a+b+c$ $\quad b=$

4. $A = 2\pi r^2 + 2\pi rh$ $\quad \pi =$

5. $P = 2l + 2w$ $\quad w =$

D. Factor each expression completely:

Hint: First look to factor out a GCF. Look for any special patterns (difference of squares, perfect square trinomials, etc.)

1. $3x^3 + 6x^2 + 9x$
2. $6a^5 - 3a^3 - 2a^2$
3. $x^3y - 3x^2y^2 + 7xy^3$
4. $x^2 - 11x - 42$
5. $z^2 - 14z + 49$
6. $2x^3 - 2x^2 + 4x$
7. $3x^2y - 6xy - 45y$
8. $z^4 - 12z^3 + 35z^2$
9. $a^2 - 10ab + 25b^2$

E. Identifying forms of equations: Match the following:

_____ Slope-intercept form of a linear equation A. $Ax + By = C$

_____ Standard form of a linear equation B. $y - y_1 = m(x - x_1)$

_____ Point-slope form of a linear equation C. $y = mx + b$

F. Linear Equations

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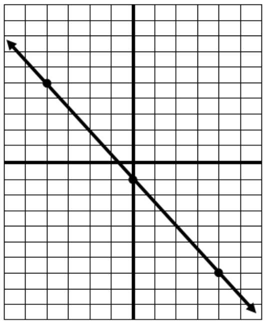
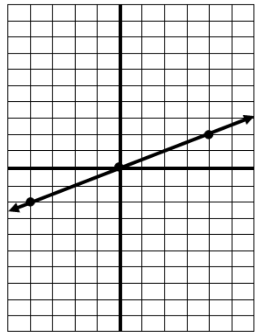
a) Find the slope:



b) Find the slope:



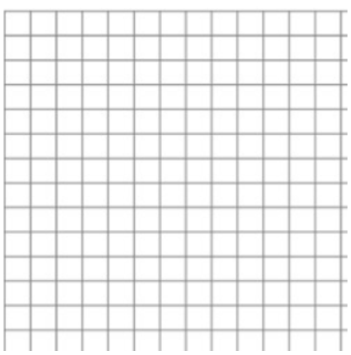
c) Find the slope of the line that passes through $(-4, -8)$ and $(6, -1)$

d) Are these lines parallel, perpendicular or neither? Explain.
$y = 2x$
$15x + 5y = 10$

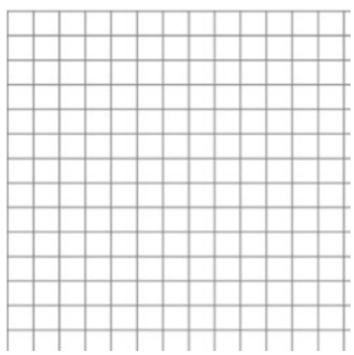
e) Are these lines parallel, perpendicular or neither? Explain.
$-4y = 8x + 2$
$y - 2x = -7$

G. Graphing Functions:

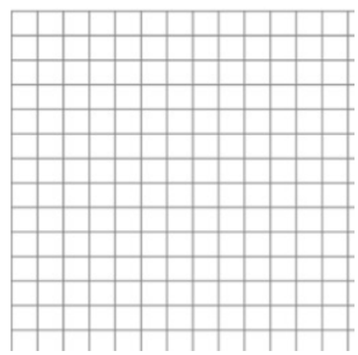
1. $2x - 5y = 10$



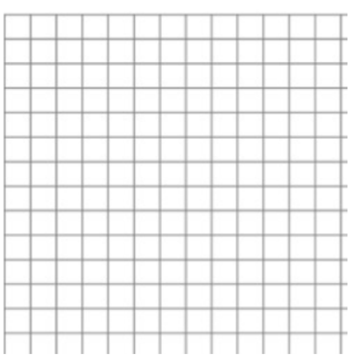
2. $x + 2y = -6$



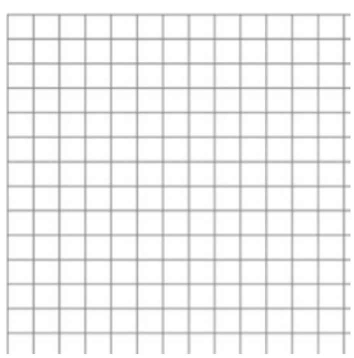
3. $y = -2$



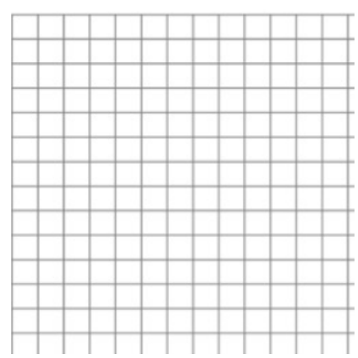
4. $x = 3$



5. $3x + 2y = 4$



6. $x - 3y = 6$

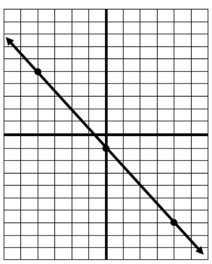
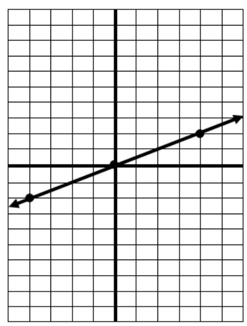
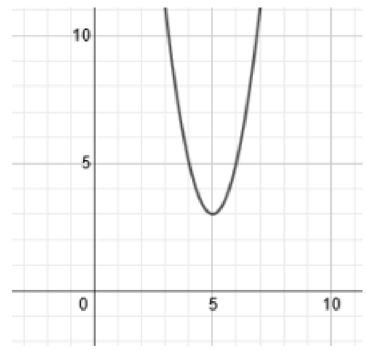


7. $y = -2/3\,x + 1$

8. $y = x^2 + 2$

9. $x^2 + y = -4x + 1$

H. Writing Equations of Linear Functions:

1) Write the equation of a line that passes through $(-6,2)$ and $(7,4)$ in both forms. Point-slope form: ___________________ Slope-intercept form:_______________	2) Write the equation of the line that goes through (-5, 3) and is parallel to the line: $y = -5x + 11$	3) Write the equation of the line that goes through (3, -5) and is perpendicular to the line: $y = -\frac{7}{5}x + 11$
4)Write the equation of the line shown: 	5) Write the equation: 	6. Write the equation for this function: 
6) Write the equation of the line that passes through $(4,-7)$ and has a slope of $\frac{-2}{3}$	7) Write the equation for the line that passes through $(-4,-8)$ and $(6,-1)$	8) Write the equation of the horizontal line passing through the point $(4,7)$ and state the slope of the line.

I. Solving Systems of Equations

Solving a system of equations means finding the (x, y) values that satisfy each equation in the system. These can be solved by:

- Graphing each equation, and reading the point (x, y) where the 2 functions intersect, or
- Using the Substitution or Elimination methods to find x and y.

1.
$x - y = 5$
$2x - y = 6$

2.
$x - 3y = 3$
$2x - 6y = 12$

3.
$2x - y = 2$
$y = x^2 - x - 6$

Solve each system of equations using the method of your choice (substitution or elimination).

4. $4x + 3y = 13$
$y = -x + 4$

5. $x + y = 12$
$x - y = 2$

6. $y = 4x$
$3x + 2y = 44$

7. $y = x^2 - 2x + 1$
$x - y = 6$

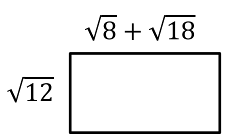
J. <u>Word Problems</u>

1. You have $40. You wish to buy a T-shirt that costs $13.50. You would also like to buy a pair of jeans. There is a 6% sales tax on clothing. What is the top price (excludes sales tax) you could pay for the jeans?

2. One movie rental club charges $25 to become a member and $2.50 to rent each movie. Another charges no membership fee, but charges $3.25 to rent each movie. How many movies must you rent to make the first club more economical?

3. The length of a rectangle is 1 cm more than four times the width. If the perimeter of the rectangle is 22 cm, what are its dimensions?

4. Find the area and perimeter.



5. What are the mean, median, and mode for the data in the following sample?
7, 16, 1, 16, 13, 16, 11, 16, 9, 15

6. (Use your calculator for this problem.) You toss a ball that travels on the path $y = -0.1x^2 + x + 2$ where x and y are measured in meters. Sketch the path of the ball. How high does the ball go?

7. (Use your calculator for this problem.) A rocket is launched from atop a 41-foot cliff with an initial velocity of 103 feet per second. The height of the rocket t seconds after launch is given by the equation $h = -16t^2 + +103t + 41$. Graph the equation to find out how long after the rocket is launched it will hit the ground. Round to the nearest tenth of a second.

8. (Use your calculator for this problem.) A rectangular sheet of cardboard measures 16 cm by 6 cm. Equal squares are cut out of each corner and the sides are turned up to form an open rectangular box. What is the maximum volume of the box?

K. Critical Thinking

1. Find the number. It is a five digit whole number. It is a palindrome. One of the digits is an odd prime. The product of its hundreds digit and 20 is 64 greater than the square of its hundreds digit. The product of its ones digit and 14 is 48 greater than the square of its ones digit. It is divisible by 8. Three of its digits are consecutive numbers. One of its digits is a square number. The sum of its digits is 26 and its ten thousands digit is 6.

2. Find the number. It is a three-digit whole number. The reciprocal of its tens digit plus the reciprocal of its ones digit is 5/12. The reciprocal of its tens digit minus the reciprocal of its ones digit is – 1/12. Its hundreds digit is the average of its tens digit and its ones digit. It is divisible by 4 and 3. The reciprocal of its hundreds digit is greater than the reciprocal of its tens digit but less than the reciprocal of its ones digit. It is greater than 500. Its tens digit is greater than 5. Its ones digit is 4.

3. Six geometry students, Al, Betty, Chuck, Dot, Ed and Flo, took a college entrance examination. Given the following clues, rank the students in order from highest score to lowest score. Al and Betty had the same score. Al's score was higher than Chuck's. Chuck scored higher than Dot. Ed's score was lower than Al's, but higher than Dot's. Ed's score was lower than Chuck's. Betty's score was lower than Flo's.

4. The weather during the Smedley's vacation was strange. It was cloudy on 13 different days, but it was never cloudy for an entire day. Cloudy mornings were followed by clear afternoons. Cloudy afternoons were preceded by clear mornings. There were 11 clear mornings and 12 clear afternoons in all. How long was the vacation?

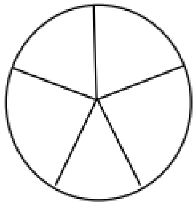
5. Describe the possible locations, in terms of quadrants or axes, for point A(x,y) if x and y satisfy the following conditions.

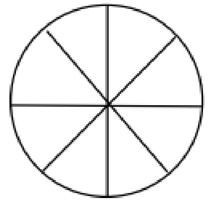
a) $xy < 0$ b) $xy > 0$ c) $xy = 0$

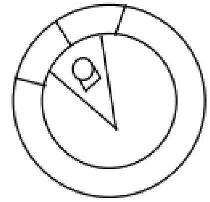
6. An airline gives each of its flight attendants one red shirt, one white shirt, one blue shirt, a navy blazer, one pair of navy pants and one pair of navy pin-striped pants. How many different outfits can a flight attendant wear if the blazer is optional?

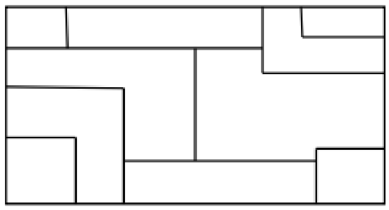
7. The weekly geometry quiz in Mrs. Jones' class consists of 5 true false questions. Is it possible for each of her 24 students to have a different pattern of answers?

8. Mapmakers have long believed that only four colors are necessary to distinguish among any number of different countries on a plane map. Countries that meet only at a point may have the same color provided they do not have an actual border. The conjecture that four colors are sufficient for every conceivable plane map eventually attracted the attention of mathematicians and became known as the "four-color problem". Despite extraordinary efforts over many years to solve the problem, no definite answer was obtained until the 1980's. Four colors are indeed sufficient, and the proof was accomplished by making ingenious use of computers. The following problems will help you appreciate some of the complexities of the four color problem. For these "maps", assume that each closed region is a different country. What is the minimum number of colors necessary for each map?

a) 

b) 

c) 

d) 

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