

Suffolk Public Schools
Honors Geometry
Summer Assignment 2017

Suggested websites: <http://www.regentsprep.org/Regents/math/geometry/math-GEOMETRY.htm>
www.pearsonsuccessnet.com
<https://www.khanacademy.org/math/geometry>
<http://interactmath.com/ChapterContents.aspx>

Assignment Objective: The goal of this assignment is for you to review Algebra 1 and Geometry topics. This will help you remember and retain knowledge and skills necessary for Honors Geometry. Upon return to school, you will be given a quiz on these topics.

Assignment Evaluation: **This assignment will be due the first day of class and counted as your first quiz grade worth 40 points.** Be sure to give your very best effort, please understand that this is an individual assignment, so it is expected that you do your own work.

Directions: There are a total of 40 questions. You will need five pieces of loose leaf paper. Fold your paper like a “hotdog” once and a “hamburger” twice, resulting in eight rectangles on the front and eight on the back. Number the rectangles, left to right so the odd numbered problems are on the left and even numbered problems are on the right. You must show all calculations in order to earn credit. A sample example is provided for each topic; if you need additional help please refer to the suggested websites listed above.

I. Solving Multi-Step Equations:

Example: solve the equation: $-18 - 6k = 6(1 + 3k)$ (given problem)
 $-18 - 6k = 6 + 18k$ (distributive property)
 $-18 = 6 + 24k$ (combine like terms)
 $-24 = 24k$ (combine like terms)
 $-1 = k$ (division property)

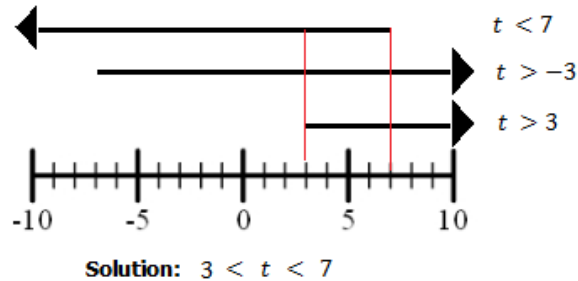
II. Solving & Graphing Inequalities:

Example: solve the inequalities : $2+t > 5$, $t + 5 > 2$, $2+5 > t$ (given problem)
(Solve each inequality)

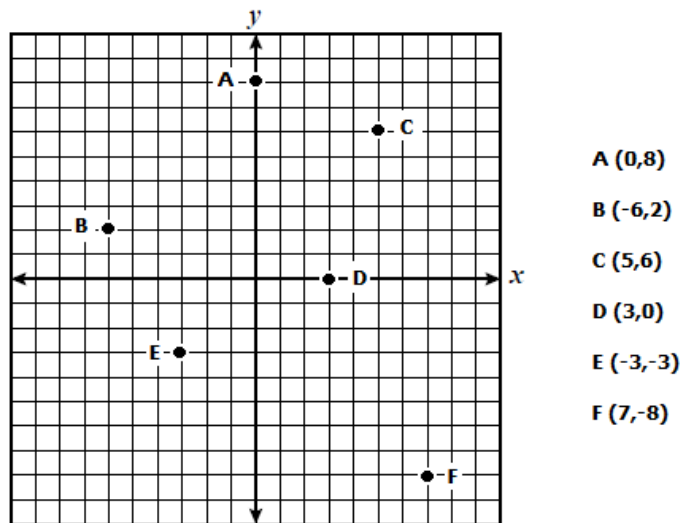
$2 + t > 5$	$t + 5 > 2$	$2 + 5 > t$
$2 - 2 + t > 5 - 2$	$t + 5 - 5 > 2 - 5$	$7 > t$
$t > 3$	$t > -3$	$t < 7$

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The solution is the common shaded region.



III. Plotting Points:



IV. Finding Slopes and Graphing Lines:

Example 1: find the slope of the line going through the points (5, -3) and (8, 5).

$$\text{Use } \frac{Y_2 - Y_1}{X_2 - X_1}; \frac{5 - (-3)}{8 - 5} \Rightarrow \frac{8}{3}; \text{ if we had to find parallel slope it would be the same: } \frac{8}{3}; \text{ if we had to find the}$$

perpendicular slope (negative reciprocal of it): $-\frac{3}{8}$.

Example 2: find the slope and y-intercept of the given line and then graph the line using slope and y-intercept.

Given: $4x - 3y = 9$, first solve the equation for y so that it is in the form of $y = mx + b$, where $m = \text{slope}$ and $b = y$ -

intercept. When we solve the above equation for y, we get: $y = \frac{4}{3}x - 3$; so the slope is $\frac{4}{3}$ and y-intercept is -3. Now, use

the y-intercept and the slope to graph this line.

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V. Solving Systems of Linear Equations:

Example 1: Solve the system using "Substitution Method":
$$\begin{aligned} 2x - y &= -3 \\ 10x + 7y &= -3 \end{aligned}$$
; with this method, you want to solve for the variable

that has the coefficient of 1, so in this example, we would want to solve for the y in the first equation. When we do that, we get: $y = 2x + 3$. Now, use this equation to represent the y in the second equation. So, we get: $10x + 7(2x + 3) = -3$

$$\begin{aligned} 10x + 14x + 21 &= -3 && \text{(distributive property)} \\ 24x + 21 &= -3 && \text{(combine like terms)} \\ 24x &= -24 && \text{(combine like terms)} \\ x &= -1 && \text{(division property)} \end{aligned}$$

Thus, we substitute $x=-1$ in the equation $y=2x+3$ and get $y=1$. We write our answer in ordered pair form, because this is the point where the two lines intersect. The solution is $(-1, 1)$.

Example 2: Solve the system using "Elimination Method":
$$\begin{aligned} 5x + 4y &= -30 \\ 3x - 9y &= -18 \end{aligned}$$
; with this method, you want to make sure that all your

variables and constants are line up underneath each other. Your goal is to make one variable coefficient the same with opposite signs. This way you can add the two equations and have only variable to solve for. Then, use substitution to finish the problem. For our example: I want to eliminate the y , so I will have to multiply the top equation by 9 and bottom equation by 4.

$$\begin{aligned} 45x + 36y &= -270 \\ 12x - 36y &= -72 \end{aligned} \quad \text{(after doing the above)}$$

Now, add the two equations to get: $57x = -342$. Solve for x to get $x=6$. To find y , you must plug 6 in for x in one of the original equations. I will use the top equation to get: $5(6) + 4y = -30$, solve for y to get $y = -15$. Place answer in ordered pair form: $(6, -15)$ is the solution.

VI. Factoring:

Example 1: Factoring special cases like difference of squares and perfect square trinomials:

A. Factor: $16x^2 - 9 \Rightarrow (4x - 3)(4x + 3)$ --- this is difference of squares, where the pattern is when we have $a^2 - b^2 \Rightarrow (a + b)(a - b)$

B. Factor: $4x^2 - 4x + 1 \Rightarrow (2x - 1)(2x - 1)$ or we can write as $(2x - 1)^2$ ---- this is a perfect square trinomial, where the pattern is when we have $a^2 - 2ab + b^2 \Rightarrow (a - b)^2$ or $a^2 + 2ab + b^2 \Rightarrow (a + b)^2$

Example 2: Factoring Trinomials – there are so many different methods that are used to accomplish this, I will show you only 1, it is called "Slide and Divide".

Factor $2n^2 + 3n - 9$

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VII. Solving Quadratic Equations by Factoring and Quadratic Formula:

Example 1: Solve by Factoring: $7r^2 - 14r = 21$ (given problem)
 $7r^2 - 14r - 21 = 0$ (must write in standard form by setting equation equal to 0)
 $7(r^2 - 2r - 3) = 0$ (factor out the GCF)
 $7(r - 3)(r + 1) = 0$ (factor the trinomial)
 $7 = 0$; $r - 3 = 0$; $r + 1 = 0$ (set each factor = to 0)
 $7 = 0$ is not true; discard; $r = 3$ & $r = -1$ are the two solutions.

Example 2: Solve by using the Quadratic Formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

$2x^2 + 3x - 20 = 0$ (given problem)
 $a = 2$; $b = 3$; $c = -20$ (list a, b, and c values from equation)

$x = \frac{-3 \pm \sqrt{(3)^2 - 4(2)(-20)}}{2(2)}$ (plug in a, b, and c values into the formula)

$x = \frac{-3 \pm \sqrt{9 + 169}}{4}$ (simplify)

$x = \frac{-3 \pm \sqrt{169}}{4}$ (simplify)

$x = \frac{-3 \pm 13}{4}$ (take the square root of 169)

$x = \frac{-3 + 13}{4}$; $x = \frac{-3 - 13}{4}$ (set up the two solutions and simplify)

$x = \frac{5}{4}$; $x = -4$ are the two solutions

VIII. Rationalizing the Denominator with Radicals:

Simplify. $\frac{4}{\sqrt{5}}$ (given problem)

$\frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$ (cannot have $\sqrt{5}$ on the bottom, rationalize, which means to multiply the top and bottom by $\sqrt{5}$)

$\frac{4\sqrt{5}}{\sqrt{25}}$ (multiply top and bottom)

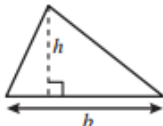
$\frac{4\sqrt{5}}{5}$ (simplify all radicals and make sure all fractions are reduced)

Final answer: $\frac{4\sqrt{5}}{5}$

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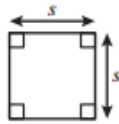
IX. Polygons & Three-Dimensional Figures:

Triangle



$$A = \frac{1}{2}bh$$

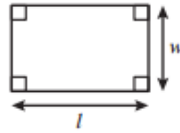
Square



$$p = 4s$$

$$A = s^2$$

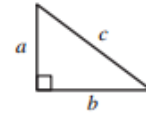
Rectangle



$$p = 2l + 2w$$

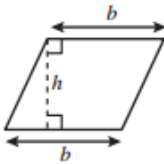
$$A = lw$$

Right Triangle



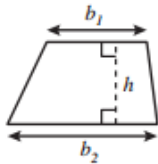
$$a^2 + b^2 = c^2$$

Parallelogram



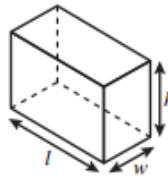
$$A = bh$$

Trapezoid



$$A = \frac{1}{2}h(b_1 + b_2)$$

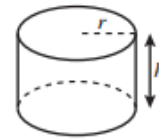
Rectangular Prism



$$V = lwh$$

$$S.A. = 2lw + 2lh + 2wh$$

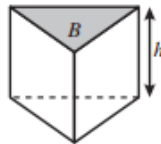
Cylinder



$$V = \pi r^2 h$$

$$S.A. = 2\pi r^2 + 2\pi rh$$

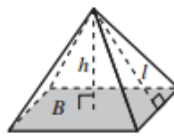
General Prism



$$V = Bh$$

$$S.A. = hp + 2B$$

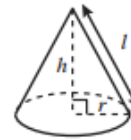
Pyramid



$$V = \frac{1}{3}Bh$$

$$S.A. = \frac{1}{2}lp + B$$

Cone

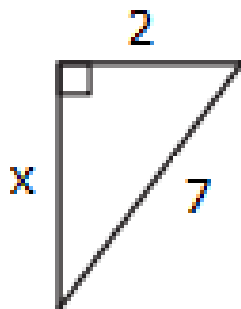


$$V = \frac{1}{3}\pi r^2 h$$

$$S.A. = \pi r^2 + \pi rl$$

Pythagorean Theorem

Find the length of the leg in the right triangle.



$$2^2 + x^2 = 7^2$$

$$4 + x^2 = 49$$

$$4 - 4 + x^2 = 49 - 4$$

$$x^2 = 45$$

$$\sqrt{x^2} = \sqrt{45}$$

$$x = \sqrt{45}$$

Simplify the radical $\sqrt{45} = \sqrt{9 \cdot 5} = \sqrt{3 \cdot 3 \cdot 5} = 3\sqrt{5} \approx 6.7$

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What is the Surface Area and Volume of the pyramid?

$$S.A. = \frac{1}{2}(\text{Slant height})(\text{perimeter of the base}) + (\text{Area of the Base: square})$$

$$\text{Volume} = \frac{1}{3} \cdot \text{Area of the Base: square} (\text{height})$$

$$S.A. = \frac{1}{2}lp + B$$

$$\text{Volume} = \frac{1}{3} \cdot (6^2)(4)$$

$$S.A. = \frac{1}{2} \cdot (5)(6 + 6 + 6 + 6) + (6^2)$$

$$\text{Volume} = \frac{1}{3} \cdot (36)(4)$$

$$S.A. = \frac{1}{2} \cdot (5)(24) + (36)$$

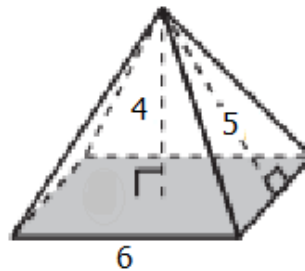
$$\text{Volume} = 12(4)$$

$$S.A. = \frac{1}{2} \cdot (120)(36)$$

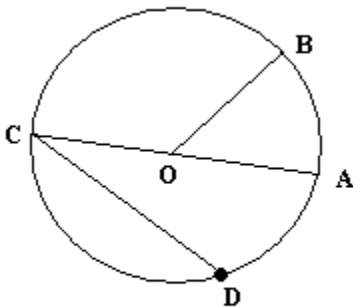
$$\text{Volume} = 48 \text{ cubic units}$$

$$S.A. = (60)(36)$$

$$S.A. = 2160 \text{ sq. units}$$



X. Basic Circle Concepts



Center: Point O

Diameter: \overline{AC}

Radius: $\overline{OA}, \overline{OB}, \overline{OC}, \overline{OD}$

Chord: \overline{CD}

Area of a Circle: $A = \pi r^2$ Circumference: $C = 2\pi r$

Degree Measure of a Circle: 360°

Degree Measure of a Semicircle: 180°

What is the area and circumference of a circle O if the diameter is 8cm?

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$\text{Radius} = \frac{1}{2} \text{Diameter}$ $\text{Radius } (r) = \frac{1}{2}(8)$ $r = 4$	$A = \pi \cdot 4^2$ $A = \pi \cdot 16$ $A = 16\pi \text{ cm}^2$ $A = 50.3 \text{ cm}^2$	$C = 2 \cdot \pi \cdot (4)$ $C = 8\pi \text{ cm}$ $C = 25.1 \text{ cm}$
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Complete the following 40 questions on your own paper. Show all work.

I. Solve the following equations:

1) $2(4x - 3) - 8 = 4 + 2x$

2) $-3(4x + 3) + 4(6x + 1) = 43$

3) $x - 1 = 5x + 3x - 8$

II. Solve the following inequalities:

4) $4(8 - 2x) - 2x \leq 32$

5) $7 + m \leq 2$ or $m + 1 > 2$

6) $-53 < 9v + 1 < -26$

III. Find the slope of the given line, and then find the parallel and perpendicular slope.

7) A(7, 9) and B(-2, -1)

8) C(0, -2) and D(4, -2)

9) E(6, -5) and F(6, 10)

Find the slope and y-intercept for each line, and then graph the line, exactly!

10) $y = x + 3$

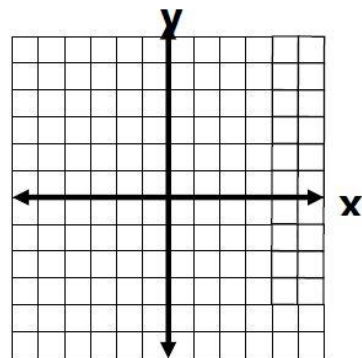
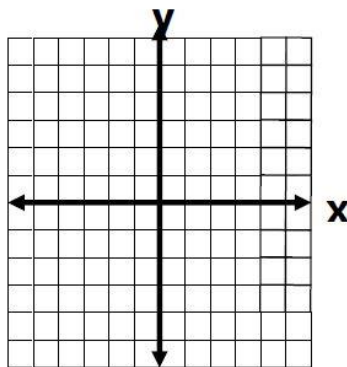
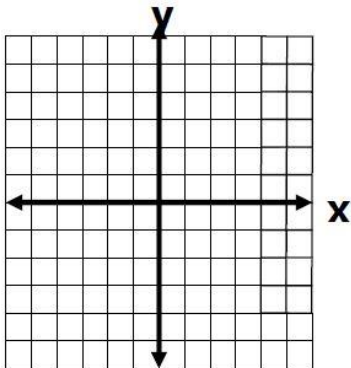
11) $y = -\frac{4}{3}x - 1$

12) $x + 2y = -8$

$m = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$

$m = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$

$m = \underline{\hspace{2cm}}, b = \underline{\hspace{2cm}}$



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IV. Solve the following systems of equations; make sure to place your solution in an ordered pair form.

13) $-4x - 15y = -17$
 $-x + 5y = -13$

14) $-x - 7y = 14$
 $-4x - 14y = 28$

15) $16x - 10y = 10$
 $-8x - 6y = 6$

16) $-7x - 8y = 9$
 $-4x + 9y = -22$

V. Factor the following:

17) $9x^2 - 1$

18) $49v^2 - 100$

19) $49n^2 - 56n + 16$

20) $100x^2 + 180x + 81$

21) $x^2 + 10xy + 25y^2$

22) $3p^2 - 2p - 5$

23) $2x^2 + 11x + 5$

24) $6a^2 + 5a - 6$

25) $4w^2 - 17w + 4$

VI. Solve the following by factoring:

26) $4k^2 + 9k + 5 = 0$

27) $8m^2 + 18m + 9 = 0$

28) $n^2 - 10n + 22 = -2$

Solve the following by using the Quadratic Formula:

29) $2x^2 - 3x - 5 = 0$

30) $2m^2 - 7m - 3 = 0$

31) $4b^2 + 8b + 7 = 4$

VII. Simplify and Rationalize completely.

32) $5\sqrt{80a^2}$

33) $-6\sqrt{150r}$

34) $\frac{2}{\sqrt{3}}$

35) $\frac{\sqrt{6}}{5\sqrt{3}}$

36) Plot and label each point A-F on the coordinate grid.

A (-3, 5)

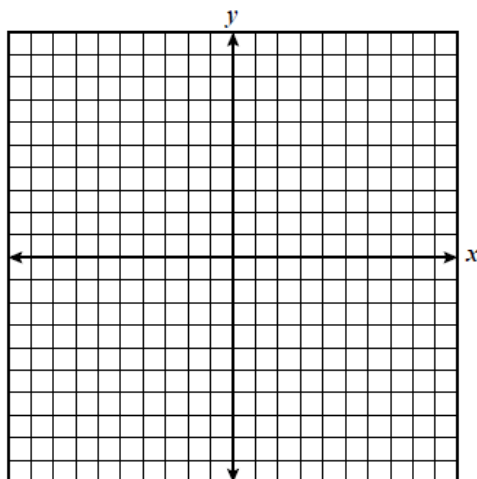
B (4, 10)

C (0, -2)

D (-9, -6)

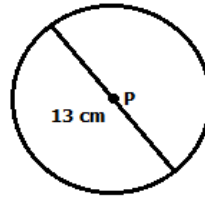
E (8, -7)

F (1, 0)



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37) What is the area and circumference of Circle P?

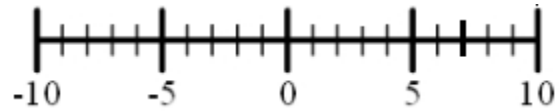


38) Solve the inequalities and graph the solution.

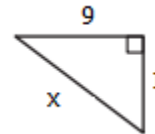
$$4 + 5 > t$$

$$4 + t > 5$$

$$t + 5 > 4$$



39) What is the length of the hypotenuse in the right triangle?



40) What is the surface area and volume of the cone?

