Honors Geometry Algebra Review Packet

Welcome to Honors Geometry at Eden Prairie High School! I look forward to meeting you soon in person. The purpose of this packet is to review some of the mathematics you may have already learned in order to prepare you for Honors Geometry. An honors-level course means that we will move at a fast pace and you will be expected to use your prior knowledge and apply it to the geometric world.

This packet contains many sections of material you have likely seen before. These skills and concepts will be used throughout the course. You are expected to complete these practice problems and turn the packet in as a homework assignment by the end of the first week of school. There is not a test specifically on this material, but these skills will be used throughout the semester, not only on problems in class, but also on assessments. If you need help while working on this packet you can review concepts at a math website – here are two good resources: http://www.purplemath.com/modules/index.htm or https://www.khanacademy.org/. Not much time will not be spent in class going over these topics – if, when we start school, you are still confused about any of these problems, please see me in the Math Resource Center (MRC, room 313) before or after school for assistance. It's OK if you don't get it all yet. Work hard and ask questions.

Unless noted otherwise, these problems should be done *without* a calculator and the answer should be written exactly (meaning no decimals). The answers are provided at the end of the packet - but in math, the work is usually more important than the answer. Show enough work appropriate to each problem to receive full credit and box your final answer. All work must be done on separate paper except for the graphing problems. Make sure you bring your packet on the first day of school.

Looking forward to meeting you!

Jenny Wagner
Honors Geometry Teacher
Eden Prairie High School

Algebra Review Packet – work must be done on separate paper

1. Simplify the following ratios:

a. $\frac{18}{27}$ b. $\frac{2 \text{ days}}{36 \text{ hours}}$ c. $\frac{15 \text{ inches}}{1.5 \text{ feet}}$

2. Simplify the following radicals:

a. $\sqrt{25}$ b. $\sqrt{24}$ c. $5\sqrt{18}$

d. $\sqrt{27} + 4\sqrt{75}$ e. $\frac{6}{\sqrt{8}}$ f. $\left(3\sqrt{5}\right)^2$

3. Solve the following for the variable:

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

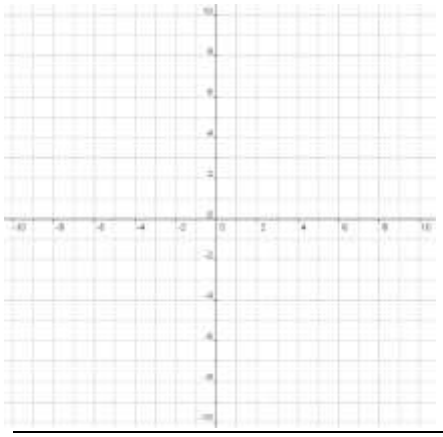
g. $\frac{y+7}{y} = \frac{2}{3}$ h. Solve for B in $A = \frac{BH}{2}$ i. Solve for r in $A = 4\pi r^2$

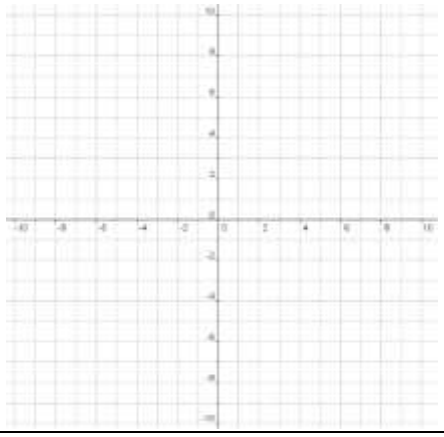
4. Graph the following on the graphs provided. You should be familiar with graphing any form.

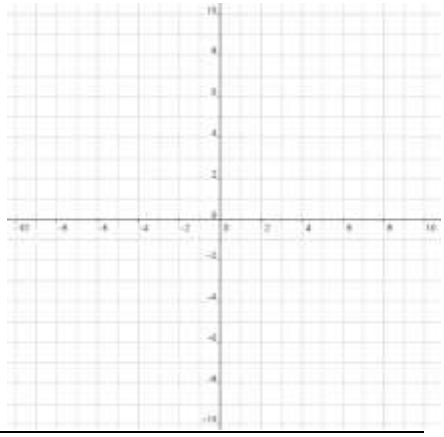
a. $y = \frac{2}{3}x - 5$
(this is slope-intercept form)

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

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

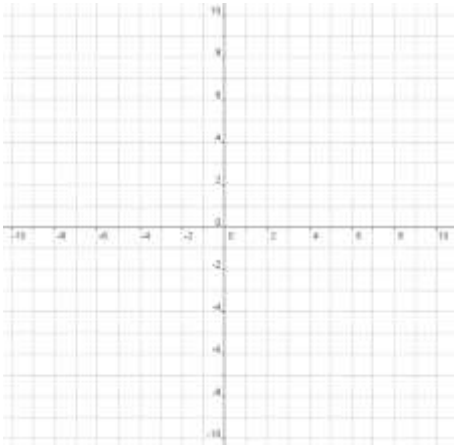






d. Graph both lines below on the graph.
Find the coordinates of the intersection point (the solution).

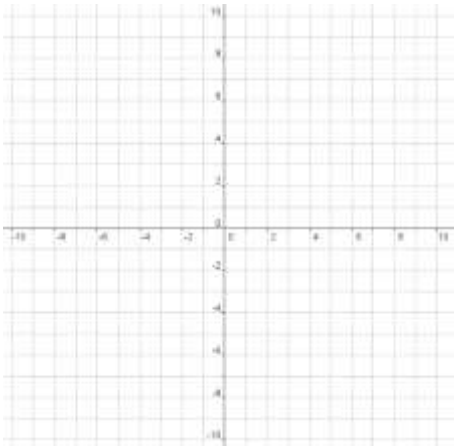
$$\begin{cases} y = -4x + 5 \\ y = \frac{5}{2}x - 8 \end{cases}$$



Solution: (_____ , _____)

e. Find the solution for the system below.

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



Solution: (_____ , _____)

5. Solve the following systems algebraically. Solve using either substitution or elimination and show work.

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

6. Write the equation of each line.

a. Write the equation of a line in slope-intercept form that has a slope of -3 and a y-intercept of 5.

b. Write the equation of a line in slope-intercept form that is vertical and goes through the point (4, -5).

c. Write the equation of a line in slope-intercept form that goes through the points (3, 1) and (0, 7).

d. Write the equation of a line in point-slope form that goes through the point (-2, 8) with a slope of 7.

e. Write the equation of a line that is parallel to y = -2x + 3 and goes through the point (-5, -8). Use point-slope form.

f. The equation 8x – 6y = -48 is in standard form. Change it to slope-intercept form.

7. Expand the polynomials using the *distributive property* of multiplication.
Write your answer with degrees in descending order… this is called the *standard form* for polynomials.

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

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

c. $(x+4)^2$
[Hint: the answer is NOT x^2+16]

d. $(2x^2-3x)(-4x^2+5)$

8. Factor the following polynomials:

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

b. $x^2-12x+36$

c. x^2-49

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

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

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

9. Solve the following by factoring:

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

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

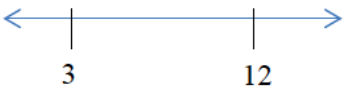
c. $x^2+7x=8$

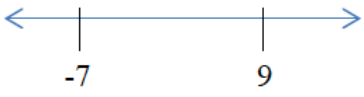
d. $3x^2-11x+10=0$

e. $2x^2-21x-65=0$

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

10. Find the distance between the numbers on the number line below.

a. 

b. 

c. The distance between two points on a number line is 8. One of the numbers is at -3. Find <u>*all*</u> possibilities for the location of the other number. [Hint: draw a picture].

For #11 on the next page…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** = $\frac{\triangle y}{\triangle x}=\frac{y_2-y_1}{x_2-x_1}$

Note: These are formulas that you should have memorized and be able to use proficiently.
Note: the Δ symbol is an uppercase delta, the fourth letter of the Greek alphabet, and is often used to denote the change or difference in a quantity.

11. For the following 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.

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

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

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

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

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

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

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 $h = 6$

14. Use properties of exponents to simplify the following:

a. $x^2 \cdot x^3$

b. $(x^2)^3$

c. $\frac{x^8}{x^3}$

d. x^{-7}

e. $(3x^2y)(5x^5y^6)$

f. $\frac{30x^7y^2}{5x^3y^8}$

15. Two vocabulary terms we will use in Geometry are *complimentary* and *supplementary*. If two angles sum to 90°, then we say that they are *complimentary*. If two angles sum to 180°, then we say that they are *supplementary*.

a. If $m\angle 1 = 72°$ and $m\angle 2 = x°$, then determine the value of x if the angles are complimentary.

b. If $m\angle 1 = 72°$ and $m\angle 2 = x°$, then determine the value of x if the angles are supplementary.

c. If $m\angle A = x + 16$ and $m\angle B = 2x - 16$, then find the numerical $m\angle B$ if the angles are supplementary.

d. Find the measure of an angle that is twice as large as its supplement. (Hint: try writing an equation).

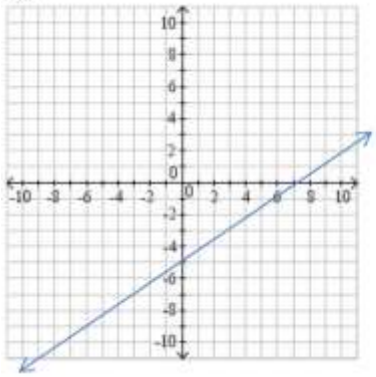
Answers

1a. $\frac{2}{3}$ 1b. $\frac{4}{3}$ 1c. $\frac{5}{6}$

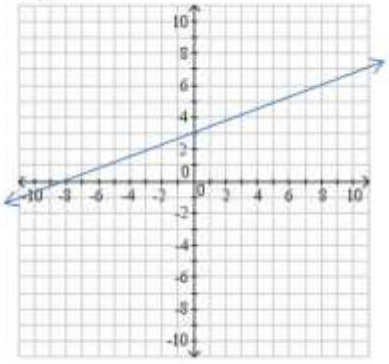
2a. 5 2b. $2\sqrt{6}$ 2c. $15\sqrt{2}$ 2d. $23\sqrt{3}$ 2e. $\frac{3\sqrt{2}}{2}$ 2f. 45

3a. $p = 4$ 3b. $u = 3$ 3c. $x = 45$ 3d. $x = -9$ 3e. $x = \frac{9}{14}$ 3f. $q = 12$ 3g. $y = -21$ 3h. $B = \frac{2A}{H}$ 3i. $r = \pm\frac{\sqrt{A}}{2\sqrt{\pi}}$

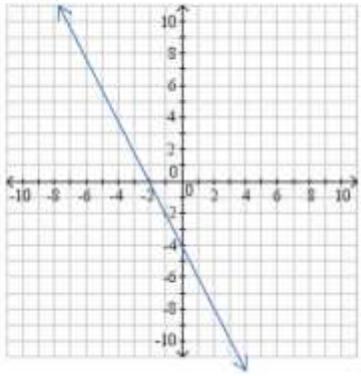
4a.



4b.



4c.



4d. (2, -3) 4e. (-4, 6)

5a. (-2, 7) 5b. $(2, \frac{11}{2})$ 5c. (5, -2) 5d. (7, 8)

6a. $y = -3x + 5$ 6b. $x = 4$ 6c. $y = -2x + 7$ 6d. $y - 8 = 7(x + 2)$ 6e. $y + 8 = -2(x + 5)$ 6f. $y = \frac{4}{3}x + 8$

7a. $x^2 - 4x - 21$ 7b. $3y^3 - 5y^2 - 10y$ 7c. $x^2 + 8x + 16$ 7d. $-8x^4 + 12x^3 + 10x^2 - 15x$

8a. $(x + 4)(x + 3)$ 8b. $(x - 6)(x - 6)\ or\ (x - 6)^2$ 8c. $(x + 7)(x - 7)$ 8d. $8x^3(x + 2)(x - 2)$ 8e. $(2x - 3)(x + 3)$ 8f. $(4n + 5)(n - 5)$

9a. $x = 3; x = -\frac{5}{8}$ 9b. $x = -13, x = -1$ 9c. $x = -8, x = 1$ 9d. $x = \frac{5}{3}; x = 2$ 9e. $x = -\frac{5}{2}; x = 13$ 9f. $x = 0; x = \frac{1}{2}; x = 1$

10a. 9 10b. 16 10c. $5\ or - 11$

11a. Pair 1: a. 20 b. (9,12) c. $\frac{4}{3}$ Pair 2: a. $3\sqrt{13}$ b. $\left(\frac{5}{2}, 3\right)$ c. $-\frac{2}{3}$

12a. $\frac{x-2}{3}$ 12b. $\frac{1}{x-6}$ 12c. $\frac{3(x-4)}{3x-4}$

13a. 24 13b. 22π 13c. -4 13d. 48π

14a. x^5 14b. x^6 14c. x^5 14d. $\frac{1}{x^7}$ 14e. $15x^7y^7$ 14f. $\frac{6x^4}{y^6}$

15a. $x = 18$ 15b. $x = 108$ 15c. $m\angle B = 104°$ 15d. $120°$