Post-Algebra I, Pre-Geometry Summer Packet

(Concepts expected to be understood upon entering a high-school Geometry course)

Name_____

Algebra I information:

Grade Level _____ School _____

Teacher _____

In order to be successful in a Geometry course at the high-school level, a student needs to have a firm grasp of the material covered in Algebra I. This packet is an attempt to highlight the skills obtained in Algebra I that are used *most often* in a Geometry course. During the school year, other Algebra I – based skills that may not be covered in this packet will be necessary for success in a Geometry class, but this packet should serve as a guide to the skills considered most vital.

Part 1: Solving Equations

Solve for the variable in each equation using any method.

1. $3x + 6 = 24$ _____	2. $\frac{3}{4}(d - 3) = 6$ _____
3. $\dfrac{8r + 5 - 3r}{4} = 10$ _____	4. $\dfrac{6}{w} = -24$ _____
5. $28 = 7(y - 7)$ _____	6. $0 = x^2 + x$ _____
7. $9x^2 = 16$ _____	8. $x^2 - 7x + 12 = 0$ _____
9. $3x^2 - 6x - 2 = 4 + 5x - 7x^2$ _____	10. $x^2 = 2x + 24$ _____
11. $\frac{1}{2}(10 - 2a) = 2$ _____	12. $-4 = 6n - 6$ _____

Part 2: Simplifying and Evaluating Expressions

1. Evaluate $f(a,b) = ab^2 + \frac{1}{2}a - 3ac$
    for $a = 12$, $b = -6$, $c = -4$.
 	
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	2. Evaluate $f(x, y, z) = 2.5x^3 + x^{-2}y - xz$
	    for $x = 4$, $y = 8$, and $z = -3$.
	
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3. Simplify: $5x^3y^4 + 7x^2y^4 - 2x^3y^4$ _____	4. Simplify: $(5y - 6)^2$ _____

5. Simplify: $\left(5x^2 - 4y^3\right)\left(3x^3 + 6y\right)$	6. Simplify: $8\sqrt{3} + 3\sqrt{27} - \sqrt{300}$
7. Simplify: $10\sqrt{6} * 2\sqrt{2} * 3\sqrt{3}$	8. Simplify: $2\sqrt{2} * 3\sqrt{3} * 5\sqrt{2} + 4\sqrt{3} * 2\sqrt{3}$
9. Simplify: $\left(3x^2 - 5y\right)^2$	10. Simplify: $\left(8x - 5y\right)^3$

Part 3: Exponents and Radicals

Simplify the following radical expressions.

1. $\sqrt{40}$	2. $4\sqrt{24}$
3. $6\sqrt{49}$	4. $2\sqrt{28} + \sqrt{63}$
5. $6\sqrt{8} - \sqrt{98}$	6. $2\sqrt{10} * 3\sqrt{6}$
7. $\dfrac{6\sqrt{48} - 2\sqrt{27}}{\sqrt{12}}$	8. $\left(2\sqrt{2}\right)^2$
9. $\left(5\sqrt{7}\right)^2$	10. $\left(\sqrt{20}\right)^3$

Part 4: Working with Like and Unlike Terms

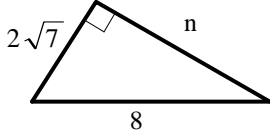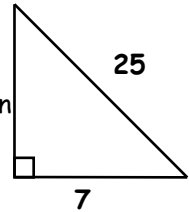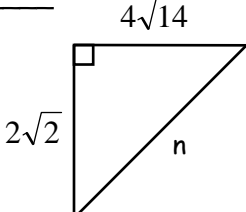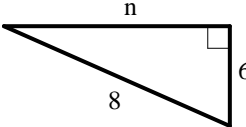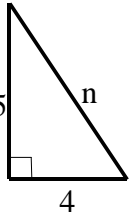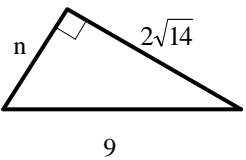|	
11. $(6x^2 + 1) + (5x^2 - 4)$	12. $(2x^3 + 11x + 2) - (x^3 - 2x + 7)$
13. $(x^2 - 3x + 3) - (x^2 + x - 1)$	14. $(14 - 16x) + (10x - 5)$
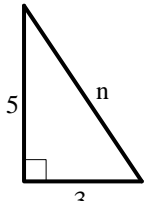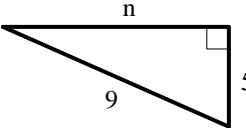
15. $(8x^3 - 1) - (20x^3 + 2x^2 - x - 5)$	16. $6x - (22x + 3 - 36x^2 + x^3)$
17. $(4x^2 - 15x + 16) + (2x - 20)$	18. $(7x^3 - 2 + x^2 + 13x) - (4x^3 + 10)$

Part 5: Factoring

Factor each expression or equation, if possible. Solve for x if you are working with an equation.

1. $3x^3 + 15x^2$ _____	2. $x^2 + 7x = -12$ _____
3. $x^2 - x - 6 = 0$ _____	4. $x^2 - 25$ _____
5. $x^2 + 4$ _____	6. $2x^2 - 5x = 3$ _____
7. $3x^2 - 19xy + 20y^2$ _____	8. $16x^2 - 9y^2$ _____
9. $10x^2 + 17xy + 3y^2$ _____	10. $-4x = 10x^2 - 24x^3$ (careful – there are 3 answers here!) _____

Part 6: Pythagorean Theorem   Use the Pythagorean Theorem to find n. Express n as a radical in simplest form. Show your work

11. _____	12. _____	13. _____
5, n, 3	n, 9, 5	$2\sqrt{7}$, n, 8
14. _____	15. _____	16. _____
25, n, 7	$4\sqrt{14}$, $2\sqrt{2}$, n	n, 8, 6
17. _____	18. _____	
5, n, 4	n, $2\sqrt{14}$, 9	

Part 7: Word Problems

A CD player costs $129.95 with a sales tax rate of 8%. What is the total cost of the CD player?	A car rental agency charges a fee of $35 per day plus $.20 for each mile driven. How much will it cost to rent the car for 4 days and drive 730 miles?
A chef cooks 1 ½ potatoes for each serving of mashed potatoes. How many servings can he make from 18 potatoes?	Suppose you are selling stuffed animals for $6 each to raise money for your club. You sold six more rabbits than monkeys. If you sold $120 worth of stuffed animals, how many of each type did you sell?
Suppose a video store charges non-member $4 to rent a video. A membership costs $21 and then videos cost only $2.50 to rent. How many videos would you need to rent in order to justify a membership?	Suppose you decide to make and sell silk flower arrangements. You spend $220.00 on materials. You sell each flower arrangement for $10.50 each. How much profit would you make if you sold 23 silk flower arrangements?

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The new parking lot has spaces for 450 cars. The ratio of spaces for full sized cars to compact cars is 11 to 4. How many spaces are for full-sized cars? How many spaces are for compact cars?	You are designing a cylindrical storage container for compost. You want it to hold 55 ft^3 and be 8 ft high. Use the formula $V = \pi r^2 h$ to find the radius of the storage container.
A ladder is 25 ft long. The ladder needs to reach to a window that is 24 ft above the ground. How far away from the building should the bottom of the ladder be placed?	There is a large building on fire. Fire trucks from two different stations respond to the fire. One station is 1 mi east and 2 mi north of the fire. The other station is 2 mi west and 1 mi south of the fire. How far apart are the two fire stations?

Part 8: Graphing

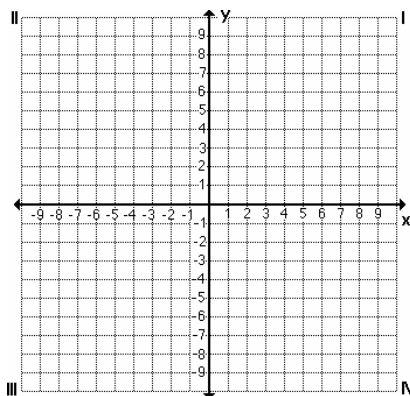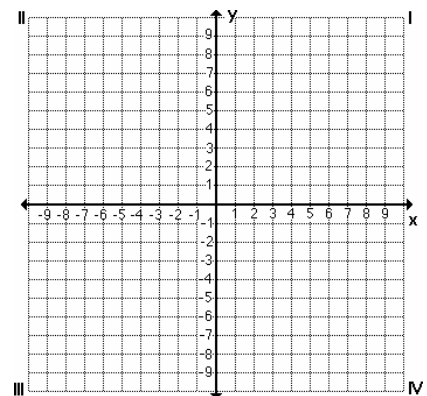Graph each of the following equations or inequalities.
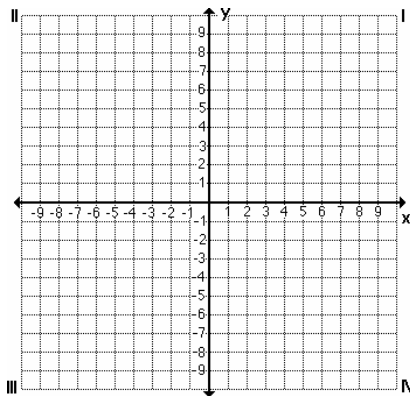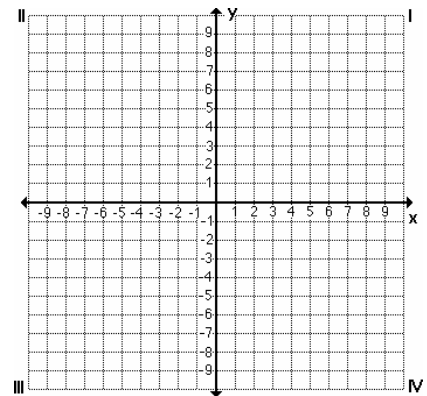
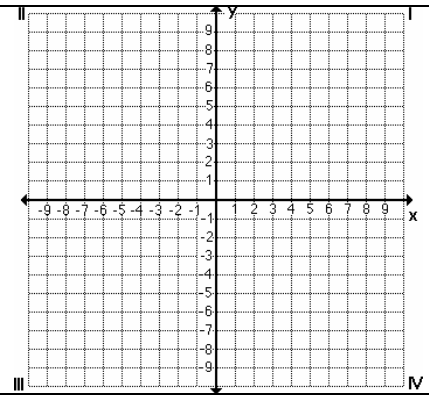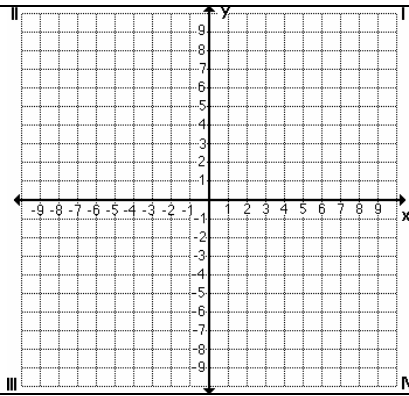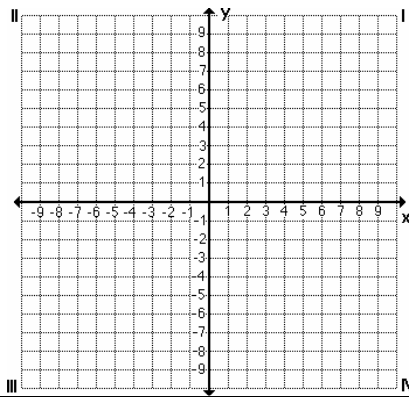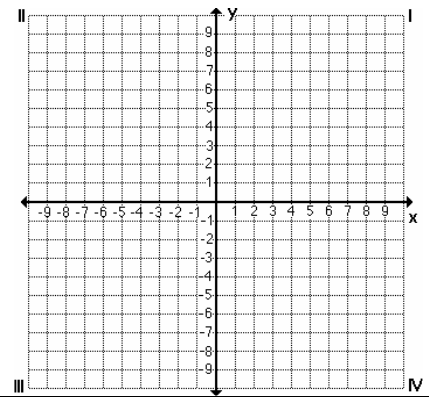|	
1. $x + y = 3$	2. $y < -2$
3. $x \geq 5$	4. $2x + 6 = 3y$
5. $y \leq -\dfrac{1}{3}x + 3$	6. $\dfrac{1}{2}x = -y + 8$

7. $y = -\frac{3}{4}x$

8. $3 - y = \frac{1}{2}$

Part 9: Systems of Equations

Find the solution to each system of equations using either substitution or elimination.

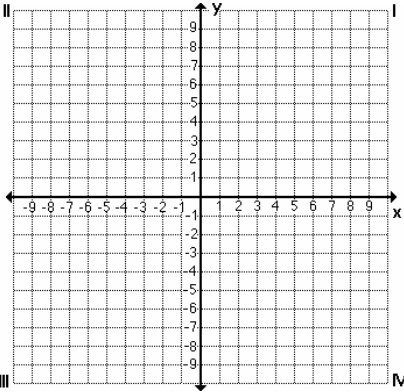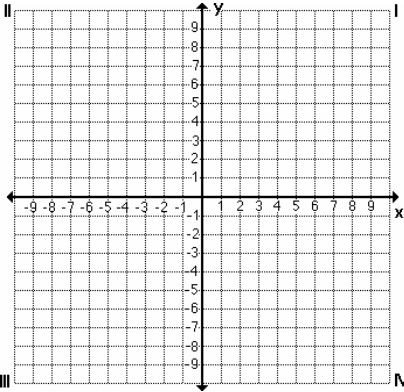|	
1. $x + y = 12$ $x = y + 2$ _____	2. $3x + 2y = 7$ $-x + 3y = 8$ _____
3. $x = 3y + 1$ $6x = y + 6$ _____	4. $x + y = 7$ $x - y = 9$ _____
5. $y = 2x$ $3x + y = 5$ _____	6. $x = 4$ $y = 3x - 5$ _____
7. $3y = 2 - x$ $2x = 7 - 3y$ _____	8. $2x + 3y = -1$ $3x + 5y = -2$ _____

Find the solution to each system by graphing.

9. $y = 2x + 1$
   $-4x + y = 7$
	10. $2x = y$
	    $x + y = 3$

_____	_____

Part 10:   Working with Formulas (Distance, Midpoint, Slope)

Find the distance between each of the following pairs of points. Put all answers in reduced radical form.
[d = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$]

1. B(3, -8) and C(9, -2)	2. X(-5, 3) and Z(4, 1)
d = _____	d = _____
3. M(8, 4) and N(-2, 28)	4. E(-4, 4) and F(0, -4)
d = _____	d = _____

Find the coordinates of the midpoint between each pair of points. [M = $(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2})$]

5. A(5, 4) and B(3, 2)	6. C(3, 3) and D(-2, -1)
M = _____	M = _____
7. T(3, -4) and R(-5, -7)	8. S(-1, 0) and V(5, -5)
M = _____	M = _____

Find the slope of the line between each pair of points. [m = $\dfrac{y_2 - y_1}{x_2 - x_1}$]

9. A(2, 8) and B(-10, -8)	10. T(0, -7) and R(10, 2)

m = _____	m = _____
11. B(8, 1) and R(-2, 5) m = _____	12. M(10, 2) and W(10, -5) m = _____