Algebra II Pre-AP Summer Packet 2017 **Name**_____

This packet is intended to give students an opportunity to recall the main concepts from Algebra I Pre-AP in order to facilitate their transition to Algebra II Pre-AP. **Students entering the PreAP level should be able to complete most of these problems on their own.** Students may consult reference materials to refresh their memory such as: old notes, Algebra I online textbook, YouTube videos, or other online references. **We expect a working knowledge of these concepts for all incoming Algebra II Pre-AP students.** Students should not attempt to complete the entire packet in one sitting, but should instead do a few problems each day.

I. Factoring Polynomials – Students need to be able to fluently factor expressions during our units on quadratic and polynomial functions. Factoring methods include: factor out a common term, difference of squares, FOIL factoring and factoring by grouping.

Factor each polynomial completely.

1) $a^2 + 11a + 18$

2) $n^2 - 5n + 6$

3) $n^2 + 6n + 8$

4) $5v^2 - 30v + 40$

5) $4v^2 - 4v - 8$

6) $v^2 - 7v + 10$

7) $5x^2 - 18x + 9$

8) $4x^2 - 35x + 49$

9) $6x^2 + 7x - 49$

10) $4x^2 - 4x + 1$

11) $1 - r^2$

12) $n^2 - 25$

13) $343b^2 - 7b^4$

14) $3 + 6b + 3b^2$

15) $49x^2 - 100$

16) $6v^3 - 16v^2 + 21v - 56$

17) $21k^3 - 84k^2 + 15k - 60$

18) $105n^3 + 175n^2 - 75n - 125$

II. Simplifying Radical Expressions – Students need to be able to fluently simplify radicals during our units on quadratic functions and radical functions.

Simplify each radical expression.

1) $\sqrt{125}$

2) $\sqrt{216v}$

3) $\sqrt{512k^2}$

4) $\sqrt{512m^3}$

5) $\sqrt{216k^4}$

6) $\sqrt{100v^3}$

7) $\sqrt{147m^3n^3}$

8) $\sqrt{200m^4n}$

9) $\sqrt{28x^3y^3}$

10) $7\sqrt{96m^3}$

11) $\sqrt{36x^2y^3}$

12) $\sqrt{384x^4y^3}$

13) $6\sqrt{72x^2}$

14) $-6\sqrt{150r}$

15) $5\sqrt{80a^2}$

16) $2\sqrt{125v}$

17) $-8\sqrt{24k^3}$

18) $8\sqrt{225x^4}$

III. Simplifying Exponents – Students will use the properties of exponents in just about every unit of study this year.

Use the rules of exponents to simplify each expression. The expressions should contain only positive exponents.

1) $2m^2 \cdot 2m^3$

2) $4r^{-3} \cdot 2r^2$

3) $2y^2 \cdot 3x$

4) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

5) $4v^3 \cdot vu^2$

6) $(2x^2)^{-4}$

7) $(4r^0)^4$

8) $(x^2)^0$

9) $(2x^4 \cdot y^{-3})^{-1}$

10) $\frac{r^2}{2r^3}$

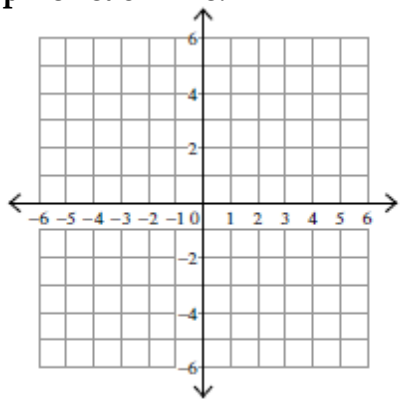
11) $\frac{4x^0y^{-2}}{4x}$

12) $\frac{3x^3y^{-1}}{x^{-4}y^0}$

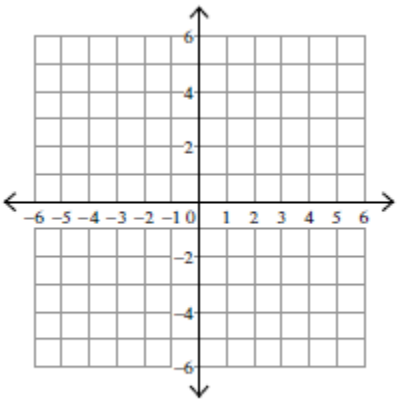
IV. Linear Functions – Students need to be able to fluently work with multiple forms of linear equations in preparation for working with more complicated relationships.

Sketch the graph of each line.

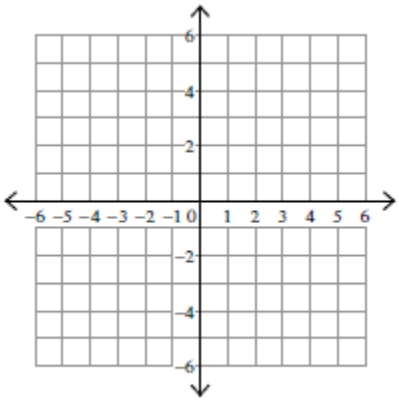
1) $x + y = 4$



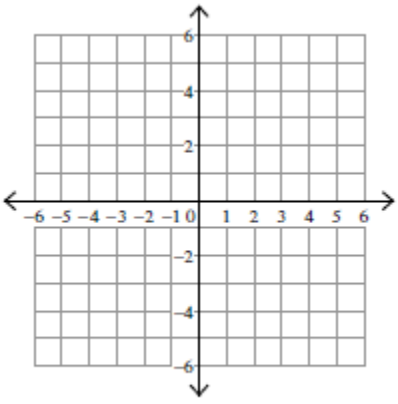
2) $2x + y = 4$



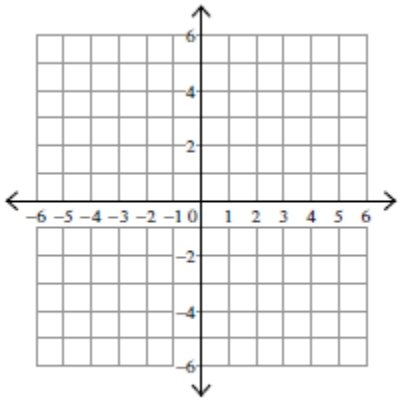
3) $x - 2y = 0$



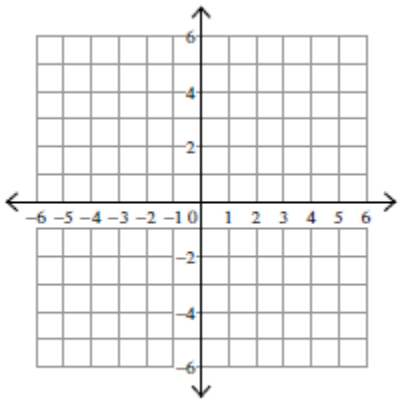
4) $2x + 3y = 6$



5) $5x - 2y = 10$



6) $x = 5$; $y = -2$ (Plot both lines on the same grid)



Write the slope-intercept form ($y = mx + b$) of the equation for each line.

7) $3x - 2y = -16$

8) $9x - 7y = -7$

9) $11x - 4y = 32$

Write the standard form ($Ax + By = C$) of the equation of the line that goes through the given point with the given slope.

10) (1, 2); slope = 7

11) (-2, 5); slope = -4

12) (3, 5); slope = $\frac{5}{3}$

13) (2, 5); slope is undefined

Write the point-slope form ($y - y_1 = m(x - x_1)$) of the equation of the line described.

14) passes through (4, 2) and is parallel to $y = -\frac{3}{4}x - 5$

15) passes through (4, 2) and is perpendicular to $y = -\frac{3}{4}x - 5$

16) passes through (-1, 4) and is parallel to $y = -5x + 2$

17) passes through (-1, 4) and is perpendicular to $y = -5x + 2$

V. Solving Systems of Linear Equations – Students need to be able to solve systems of two linear equations in preparation for solving systems of three linear equations and systems of linear and quadratic equations.

Solve each system of equations using substitution or elimination.

1) $-4x - 2y = -12$
$4x + 8y = -24$

2) $x - y = 11$
$2x + y = 19$

3) $8x + y = -16$
$-3x + y = -5$

4) $y = 6x - 11$
$-2x - 3y = -7$

5) $y = -2$
$4x - 3y = 18$

6) $-3x - 3y = 3$
$y = -5x - 17$

VI. Solving Linear Equations – Students need to be comfortable with modeling real life situations using algebraic equations.
For each word problem, define the variable(s) and write (an) equation(s). Then solve algebraically, graphically or using tables.

1) The length of a rectangle is 6 feet more than the width of the rectangle. The perimeter is 32 feet. What is the width of the rectangle?

Define variable(s):

Write an equation(s):

Solve algebraically:

2) Jordan leaves his house and rides his bike at 10 mi/h. Half an hour later, his brother Tim leaves the house and rides in the same direction at 12 mi/h. If their rates stay the same, when will Tim catch up to Jordan?

Define variable(s):

Write an equation(s):

Solve algebraically:

3) Bricks are available in two sizes. Large bricks weigh 9 pounds and small bricks weigh 4.5 pounds. A bricklayer has 14 bricks that weigh a total of 90 pounds. How many of each type of brick are there?

Define variable(s):

Write an equation(s):

Solve algebraically:

4) The Anderson's family car needs repairs so they've taken their car to two repair shops to get estimates for the cost of repairs. Mike's Motors is going to charge $70 for each hour of labor and $650 for replacement parts. Arnie's Autos is going to charge $55 for each hour of labor and $800 for replacement parts. For how many hours of labor will the total cost of fixing the cars be the same? For how many hours of labor will Mike's Motors be the less expensive option?

Define variable(s):

Write an equation(s):

Solve algebraically:

5) The Miller's backyard pond holds 120 gallons of water and is draining at a rate of 6 gal/minute. Little Suzy Miller, sad to see her fish pond emptying, is trying to refill the pond by pouring in a one-gallon bucket of water each minute. How long will it take for the pond to be half empty?

Define variable(s):

Write an equation(s):

Solve algebraically: