AP Precalculus: MA355
Summer Assignment

Welcome to AP Precalculus.

Overview:
This packet contains problems and a review of Algebra 2 topics necessary for Precalculus. Using your notes from this year, an Algebra 2 text or Google would be best. YouTube, Khan Academy, and Freckle are helpful sites. If you are having a challenging time, email me. I will check my email on Mondays in the summer and respond within forty-eight hours.

Summer Assignment:
Solve the problems contained in the packet. You may use your calculator to complete the problems. Unless stated otherwise, answers should be in the simplest radical form or common fraction. You must show your work.

The grade for Summer Assignment:
We will review the answers/solutions to the questions on the **first full day** of class. I will check the assignment for completion, and you will earn a completion grade (15 points), but it will not be collected. **You will earn a zero if you do not have the packet on the first day of class.** Afterward, I will place the solutions on Blackbaud. On the **third full day of class**, you will have a test on this material.

Materials Needed for Class:
1) Text: provided in August
2) Binder: 1.5 – 2 inches; 3 rings
3) Notebook or loose-leaf paper on which to take notes
4) Graphing calculator: TI84-plus CE preferred

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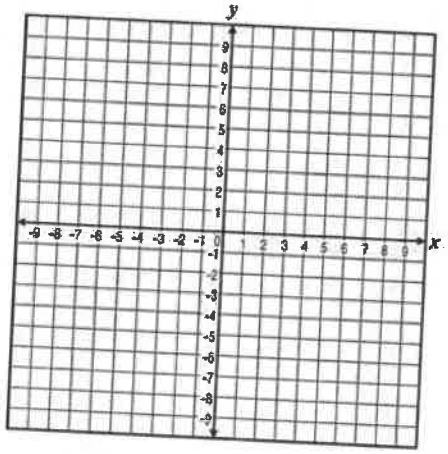
NAME: _____

A. Linear Equations:

1) For each equation, identify the slope and y-intercept. Graph the line.

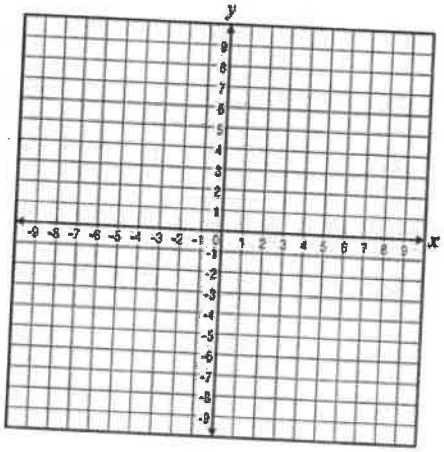
a) $y = \frac{1}{2}x - 4$

$m =$ _____ $b =$ _____



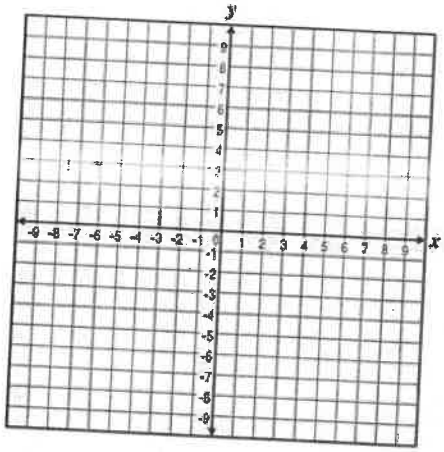
b) $-4x + 4y = 16$

$m =$ _____ b = _____



c) $6x - 3 = -15$

$m =$ _____ b = _____



d) Find the slope of the line going through the points (-5,4) and (7, 8). m = _____

e) Determine whether the lines passing through the following lines are parallel, perpendicular, or neither. Line 1: (-4,6), (5,9) Line 2: (0, - ½), (3, ½)

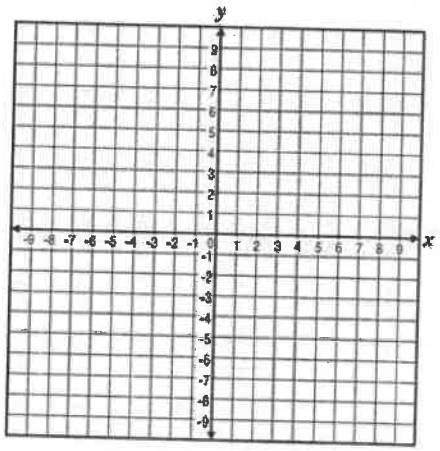
_____

B. **Quadratics**:

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

a) Identify the vertex: _____

b) Write the equation for the axis of symmetry:



c) What are the roots **(round to hundredths)**?

_____

d) What is the y-intercept? _____

e) What is the max/min? _____

f) Identify the domain: _____

g) Identify the range: _____

h) What is the end behavior?

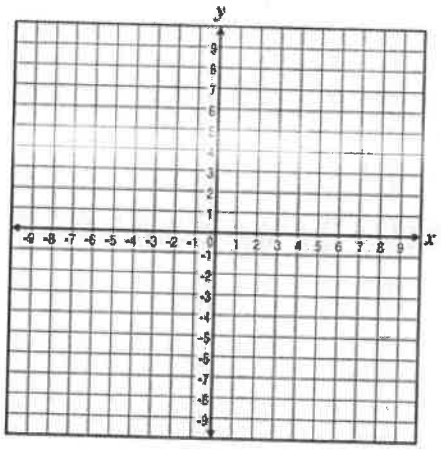
as $x \to \infty$ $f(x) \to$ _____

as $x \to -\infty$ $f(x) \to$ _____

i) What is the increasing interval? _____

j) What is the decreasing interval? _____

2) Graph: $y = -2x^2 - 5$ Compare the graph to $y = x^2$



_____

_____

_____

3) Identify the parent function and the transformations from the parent function of $y = -3(x+2)^2 + 4$

Parent function: _____

Transformations:

_____

_____

4) Identify the vertex, axis of symmetry, and x intercepts of $y = (x + 1)(x + 2)$.

Vertex: _____ Axis of symmetry: _____

x-intercepts: _____

5) Write the quadratic, $y = -4(x - 1)(x + 3)$ in standard form. _____

6) Solve by factoring: $4x^2 - 5x - 6 = 0$ $x =$ _____

7) Factor and determine the roots: $y = x^2 - 7x - 18$ _____

8) Find the zeros of the function by writing the function in intercept form: _____
$y = x^2 + 7x - 30$

9) Factor: $25x^2 - 121 =$ _____

10) Factor: $16x^2 + 8x + 1 =$ _____

11) Factor: $12x^2 - 4x - 40 =$ _____

12) Find the zeros by writing the function, $f(x) = 3x^2 - 3x$, in intercept form _____

13) Solve $5(x-3)^2 = 75$ by finding square roots. $x =$ _____

14) Solve $x^2 - 5x - 24 \leq 0$ _____

15) Use the quadratic formula to solve. Write answer in simplest radical form:

$2(x + 2)^2 - 5 = 8$ $x =$ _____

16) Solve the equation by completing the square: $x^2 - 5x + 2 = 0$

$x =$ _____

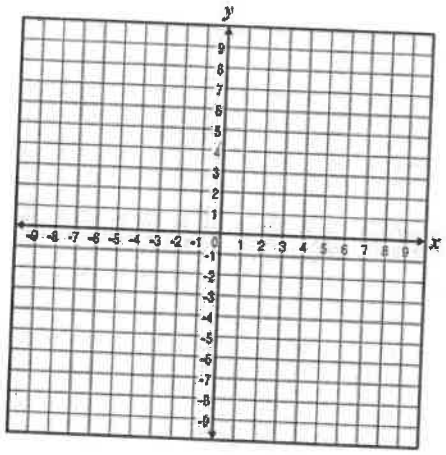
17) Solve the equation by completing the square: $x^2 + 9x + 20 = 0$ $x =$ _____

18) Use the quadratic formula to solve: $3x^2 + 7x + 3 = 0$ $x =$ _____

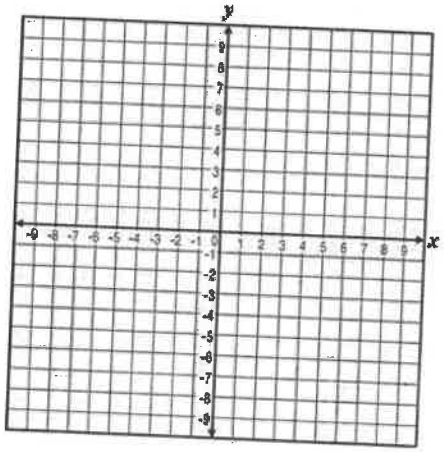
19) Solve the equation: $16x^2 - 7x = 17x - 9$ $x =$ _____

20) Find the value of the discriminant and give the number and type of solutions of the equation: $4x^2 - 8x + 3 = 0$.

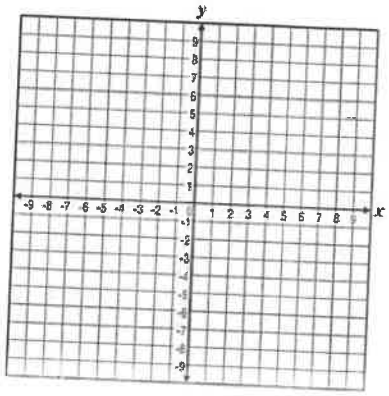
21) Graph: $y \geq 2x^2$



22) Graph: $y \geq x^2 - 4$ and $y < -2x^2 + 7x + 4$



23) Use either the table or graphing functions on the graphing calculator to solve
$x^2 + 3x \leq 10$



C. Factoring: Factor the following polynomials:

1) $2x^2 - 8 =$ _____

2) $x^3 + 2x^2 + 5x + 10 =$ _____

3) $x^3 + 2x^2 - 3x - 6 =$ _____

4) $x^3 - 125 =$ _____

5) $8x^3 + 1 =$ _____

6) $125x^3 - 27 =$ _____

7) $216x^3y^3 - 343z^3 =$ _____

8) $27x^3 + 729y^3 =$ _____

D. Expand: Square and Cubes of binomials:

1) $(x + 7)^3 =$ _____

2) $(a - 9)^3 =$ _____

3) $(5x + 3)^2 =$ _____

4) $(6x - 3y)^2 =$ _____

5) $(8x + 4y)^3 =$ _____

6) $(12x - 7y)^3 =$ _____

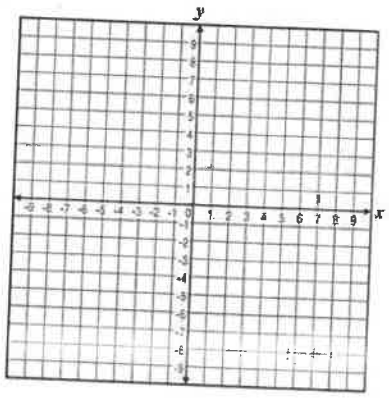
E. Transformations: Describe in words the transformations (horizontal translation by x units left/right, vertical translation x units up/down, vertical stretch by a factor of, vertical compression by a factor of, horizontal stretch by a factor of, horizontal compression by a factor of, reflection over the y axis, reflection over the x axis). Graph the parent function and the given function.

1) $f(x) = |x| - 2$

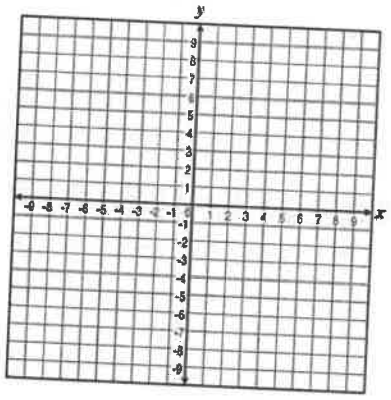
_____

_____

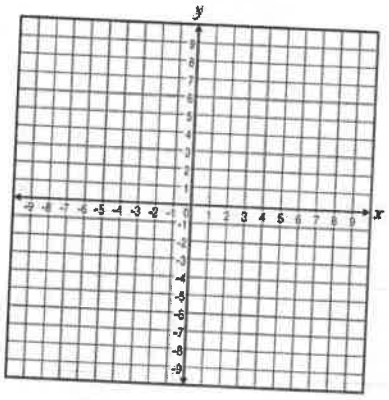
_____



2) $f(x) = -x^3 + 2$



3) $f(x) = -(3x-2)^2 + 4$



F. Add, subtract, and multiply Polynomials: Simplify the following

1) $(5x^2 + 12x - 34) + (12x^2 - 7x - 10) =$ _____

2) $(16x^3 - 56x + 17) - (-21x^2 + 16x - 23) =$ _____

3) $(2x^2 + 6x)(3x^2 - 5x - 9) =$ _____

G. Properties of Exponents and Polynomials

24) Convert 54678 to scientific notation: _____

25) Convert 0.0000912 to scientific notation: _____

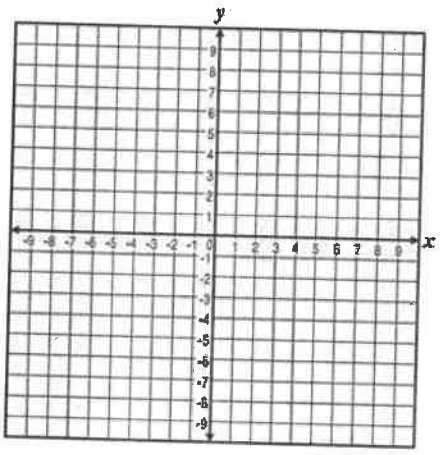
26) Convert 1.743×10^3 to standard form: _____

27) Convert 4.007×10^{-2} to standard form: _____

28) Simplify such that all exponents are positive: $\frac{4x^2y^6}{8x^7y^5} =$ _____

29) Simplify such that all exponents are positive: $\frac{x^5y^{-4}}{6x^7} \cdot \frac{12x^4}{x^3y^{-8}} =$ _____

30) Graph: $y = x^3 + 5x^2 + 2x - 8$



a. Minimum: _____

b. Maximum: _____

c. Roots (Round to hundredths):

_____

d. Y-intercept: _____

e. End behavior:

_____

_____

f. Increasing interval: _____

g. Decreasing interval: _____

31) Simplify: $(3x^3 - 6x^2 + x - 9) - (2x^3 + 7x - 5) =$ _____

32) Multiply: $(2x + 3)(3x - 2) =$ _____

33) Multiply: $(x + 6)^2 =$ _____

34) Factor: $x^2 - 81 =$ _____

35) Multiply: $(a - 3)^3 =$ _____

36) Multiply: $(2x - 6)^2 =$ _____

37) Multiply: $(3x + 2)^3 =$ _____

38) Factor: $16x^3 - 44x^2 - 42x =$ _____

39) Factor: $x^4 - 25 =$ _____

40) Factor completely: $7x^3 - 56 =$ _____

41) Multiply: $(2x - 1)(3x^2 - 5x + 4) =$ _____

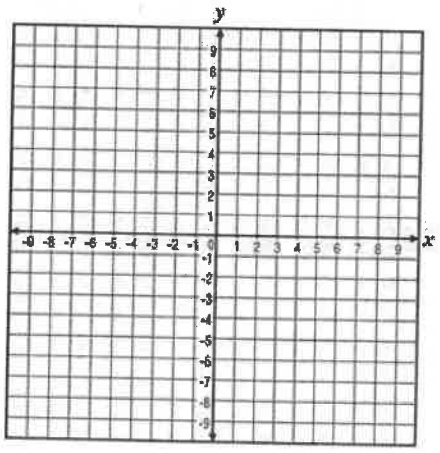
42) Find **all the real zeros** of $f(x) = x^3 - 4x^2 - 11x + 30$ _____

43) Find **all the zeros** of $f(x) = x^3 - 2x^2 + x - 2$ _____

44) Graph $y = 2\sqrt{x}$. State the domain and range.

Domain: _____

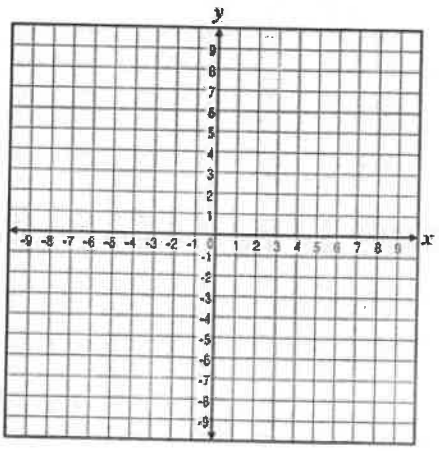
Range: _____



45) Graph $y = -3\sqrt{x+1} - 4$. State the domain and range.

Domain: _____

Range: _____



H. nth roots and rational exponents:

52) Evaluate: $25^{3/2} =$ _____

53) Evaluate: $32^{-2/5} =$ _____

54) Simplify: $\left(\frac{-2x^3}{3y^{-2}}\right)^4 =$ _____

55) Simplify: $(-3x^{-5}y^2)^{-2} =$ _____

56) Evaluate to simplest fraction form: $64^{-2/3} =$ _____

57) Evaluate to 2 decimal places: $(\sqrt[4]{187})^3 =$ _____

58) Simplify: $7\sqrt[3]{3} - 2\sqrt[3]{3} =$ _____

59) Simplify: $3\sqrt{2} \cdot 5\sqrt{8} =$ _____

60) Simplify $8^{2/3} =$ _____

61) Simplify: $\sqrt[4]{81x^6y^8} =$ _____

62) Simplify: $6\sqrt{45} - 7\sqrt{20} =$ _____

63) Solve: $\sqrt{4x+1} = \sqrt{x+10}$ $x =$ _____

64) Solve: $\sqrt{3x-8} + 1 = \sqrt{x+5}$ x = _____

I. Rational Expressions

65) $\frac{12}{5x} + \frac{7}{6x} =$ _____

66) $\frac{x^2-5}{x^2+5x-14} - \frac{x+3}{x+7} =$ _____

67) Simplify: $\frac{\frac{1}{2x-5} - \frac{7}{8x-20}}{\frac{x}{2x-5}} =$ _____

J. Probability

1) Describe all the possible outcomes when three coins are tossed at once.

2) What is the theoretical probability of obtaining heads when tossing a coin? _____

3) What is the theoretical probability of pulling queen from a standard deck of cards? ___

4) What is the theoretical probability of pulling a club that is less than 6 from a standard deck of cards? _____

5) What is the probability of tossing an odd number when a six-sided die it tossed? _____

6) What is the probability of tossing a number greater than 4 and picking an ace from a standard deck of cards? _____

7) You have a bag with 7 yellow marbles, 6 green marbles, and 10 red marbles.

a) What is the probability of choosing a yellow marble, then a red marble, if you replace the first marble before you draw the second marble. _____

b) What is the probability if you do not replace the fist marble? _____

8) What is the probability of tossing a three on the first toss and a four on the second toss of a six-sided die? _____

9) What is the probability of picking a face card or a spade from a standard deck of cards? _____

10) A card is randomly picked from a standard deck of cards. What is the probability that it is a 10 or a face card? _____

11) Consider the letters in the word MARCH.

a) In how many ways can you arrange the letters if the order is important? _____

b) In how many ways can you arrange three of the letters? _____

c) In how many ways can you arrange all the letters if order is not important?

_____

d) In how many ways can you arrange three of the letters if order is not important?

____

12) Evaluate 6! = _____

K. Sequences and Series:

1) Describe the pattern and write the next three numbers: 3, 5, 7, 9 _____, _____, _____

2) Describe the pattern and write the next three numbers: 1, -2, 4, -8, _____, _____, _____

3) $\sum_{n=1}^{n=5}(2n+6) =$ _____

4) Write a rule for the sequence and find a_{15}: 3, 8, 13, 18….. $a_{15} =$ _____

5) Write a rule for the sequence and find a_{15} : 55, 47, 38, 31… $a_{15} =$ _____

6) Write the rule for the sequence and find a_8: 27, 9, 3, 1… $a_8 =$ _____

7) Write a rule for the sequence and find a_9: -1, 2, -4, 8, -16 $a_8 =$ _____

L. **Matrices: Evaluate:**

1) $\begin{bmatrix} 4 & 8 \\ 6 & 9 \end{bmatrix} + \begin{bmatrix} 7 & 10 \\ 12 & 9 \end{bmatrix} =$ _____

2) $\begin{bmatrix} 0 & 11 & -13 \\ -10 & 14 & 19 \end{bmatrix} - \begin{bmatrix} 17 & 8 & 5 \\ 1 & 2 & 26 \end{bmatrix} =$ _____

3) $5\begin{bmatrix} 3 & 7 \\ 10 & -9 \\ 17 & 12 \end{bmatrix} =$ _____