CP1: Pre-calculus: MA401
Summer Assignment

Overview:

This packet contains problems which is a review of Algebra 2 topics necessary for Pre-calculus. These topics include linear equations and slope, quadratics, factoring, simplify expressions with exponents, rational expressions, radicals, absolute value, and inequalities.

Summer Assignment:

You may use your calculator to complete the problems. Answers should be in simplest radical or fraction forms unless stated otherwise. You should use an algebra 2 text, your notes, or google it. Khan Academy or Freckle are helpful sites.

Grade for Summer Assignment:

We will go over the answers/solutions on the **first full day of class**. This assignment will not be collected, but you will earn a completion grade. On the **third full day of class**, you will have a test on this material.

Materials Needed for Class:

1) Binder: 1.5 – 2 inches; 3 rings
2) Notebook or loose leaf in which to take notes.
3) Graphing calculator: TI-84 Plus CE preferred.

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The only way
to learn
mathematics
is to do
mathematics.

PAUL HALMOS

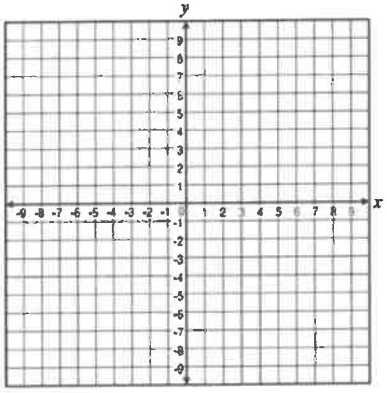
NAME: _____

A. **Linear Equations**: For each linear equation, find the slope, y-intercept, and graph the line.

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

i. m = _____

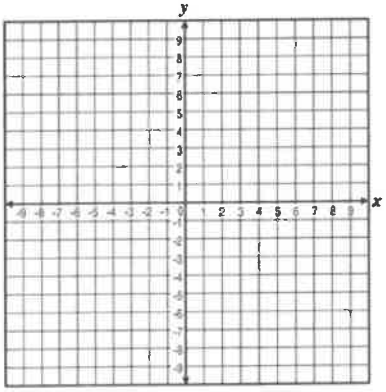
ii. b = _____



2) $2x - 6 = y$

i. m = _____

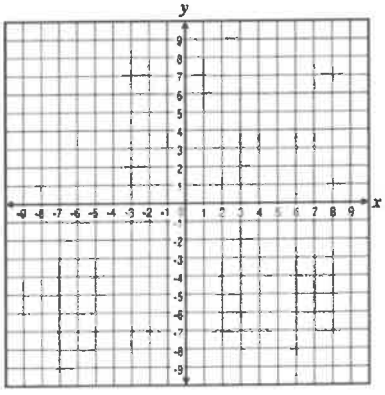
ii. b = _____



3) $4x - 2y = 10$

i. m = _____

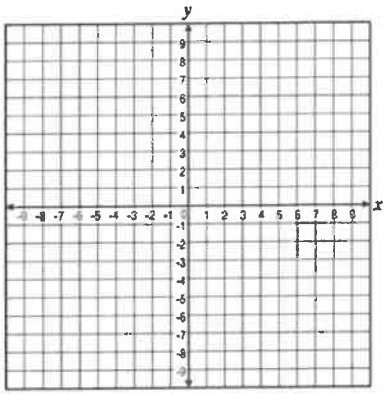
ii. b = _____



4) $2x + 3y = 3$

i. m = _____

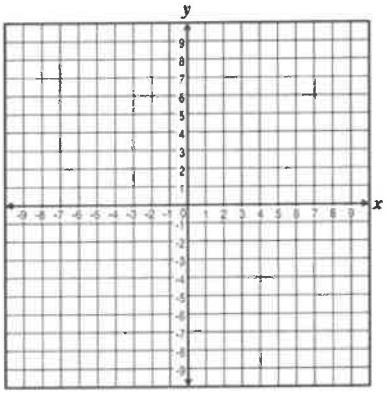
ii. b = _____



5) $y = 5$

i. m = _____

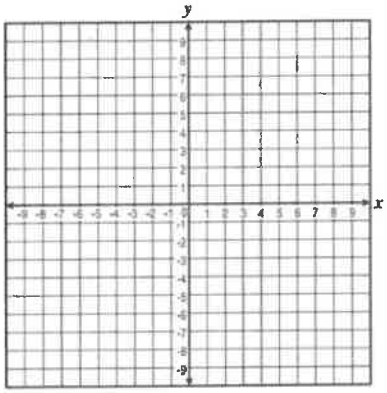
ii. b = _____



6) $6x - 3 = -15$

i. m = _____

ii. b = _____



B. **Forms of the equation of the line**. For the following problems, determine the slope of the linear function and write the equation of the line.

1) Find the slope of the line passing through the points (-5, 4) and (7, 8).

i. m = _____

ii. equation: _____

2) Write the equation of the line passing through the point (-3, 4) with a slope of 0.5. Write the equation in point-slope, slope intercept, and standard forms:
   i. Point-slope: _____
   ii. Slope-intercept: _____
   iii. Standard: _____

3) Find the slope of the line passing through the points (7/8, ¼) and (-5/4, ¾). Write the equation of the line in slope-intercept and point- slope form.
   i. Slope = _____
   ii. Slope-intercept: _____
   iii. Point-slope: _____

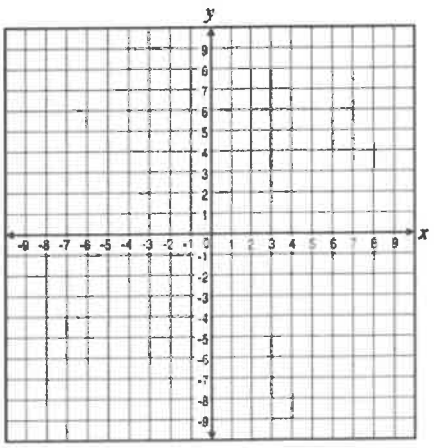
C. Parallel and perpendicular lines:

1) Determine whether the lines passing through the following pairs of points are parallel, perpendicular, or neither. Explain your answer. Line 1: (-4, 6), (5, 9); Line 2: (0, 0.5), (3, 0.5)

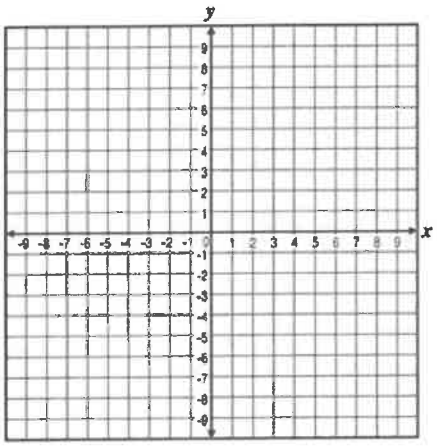
2) Write the equation of the line perpendicular to the line $y = 0.75x - 2$ and passing through the point (0, -5) in slope intercept form.

D. Quadratics:

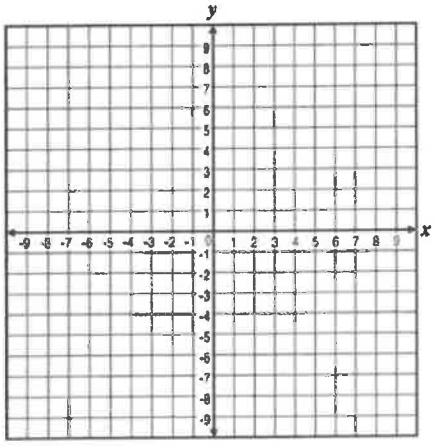
1) Graph $x^2 - x - 6 = f(x)$
   i. Identify the vertex: _____
   ii. Write the equation for the axis of symmetry:
   iii. What are the roots? _____
   iv. What is the y-intercept? _____
   v. What is the max/min? _____
   vi. Identify the domain: _____
   vii. Identify the range: _____



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



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



E. Properties of Exponents and Polynomials

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

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

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

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

5) $(x + 6)^2 =$ _____

6) $x^2 - 81 =$ _____

7) $(2x - 6)^2 =$ _____

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

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

10) Simplify and write the expression with only positive exponents: $(2c^{-4}d^5)^{-5} =$ _____

11) Find the product: $\frac{x^2+2x-24}{x^3+6x^2} \cdot \frac{x^2+3x}{x^2-x-12} =$ _____

F. nth roots and rational exponents:

1) Simplify: $\sqrt{80} =$ _____

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

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

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

G. **Factoring:** Factor the following polynomials:

1) $x^2 + 5x + 6 =$ _____

2) $y^2 + 15y + 36 =$ _____

3) $p^2 - 12p + 27 =$ _____

4) $a^2 + 10a - 75$ _____

5) $25x^2 - 1 =$ _____

6) $2x^2 - 27x + 36 =$ _____

7) $3x^2 + 7x - 20 =$ _____

8) $-6a^2 - 600 =$ _____

9) $4y^2 + 15y - 4 =$ _____

10) $x^4 - y^4 =$ _____

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

12) $x^3 - 125 =$ _____

13) $125x^3 - 27 =$ _____

14) $8x^3 + 1 =$ _____

15) $125x^3 - 27 =$ _____

16) $-18a^3b + 27a^2b =$ _____

17) $216p^3 + 125q^3 =$ _____

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

19) $2k^3 + 8k^2 - k - 4 =$ _____

20) $3x^4 - 48x^2 =$ _____

H. **Solve equations**:

1) $-7(m-9) - 2m = 12$ $m =$ _____

2) $-3(4 - 8p) + 6 = 4(6p - 1) - 2$ $p =$ _____

3) $|7x + 7| = 77$ _____

4) $|6a + 9| + 1 = 4$ _____

5) Use the quadratic formula to solve: $5n^2 - 4n + 2 = 0$ $n =$ _____

Information Sheet

Parent: $y = x^2$ Standard form: $y = ax^2 + bx + c$

$V = (\frac{-b}{2a}, y)$ axis of symmetry: $x = \frac{-b}{2a}$

Vertex form: $y = a(x - h)^2 + k$ $V = (h, k)$

$(a - b)^2 = a^2 - 2ab + b^2$

$(a + b)^2 = a^2 + 2ab + b^2$

$a^2 - b^2 = (a + b)(a - b)$

$(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$

$(a - b)^3 = a^3 - 3a^2 b + 3ab^2 - b^3$

$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

$a^m a^n = a^{m+n}$

$(a^m)^n = a^{mn}$

$(ab)^m = a^m b^m$

$a^{-m} = \frac{1}{a^m}$

$a^m = \frac{1}{a^{-m}}$

$a^0 = 1$

$\frac{a^m}{a^n} = a^{m-n}$

$(\frac{a}{b})^m = \frac{a^m}{b^m}$