MATH 111: EXAM 01

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Answer the questions in the spaces provided on the question sheets and turn them in at the end of the class period. Unless otherwise stated, all supporting work is required.

Name: _____

1. Definitions

1 (3 Points). *State the three Special Product Formulas for algebraic expressions A and B:*

(a) Sum and difference of same terms:

(b) Square of a sum:

(c) Square of a difference:

2 (6 Points). *Let a, b be non-zero real numbers and m, n integers. Fill in the blanks*

(i) $a^0 =$ _____,

(ii) $a^{-n} =$ _____.

(iii) $a^m \cdot a^n =$ _____

(iv) $\dfrac{a^m}{a^n}$ _____

(v) $(a \cdot b)^n$ _____

(vi) $\left(\dfrac{a}{b}\right)^n$ _____

Date: May 24, 2013.

3 (2 Points). *State the general form of a quadratic equation and the Quadratic Formula.*

4 (3 Points). *Fill in the blanks:*

To make $x^2 + bx$ *a perfect square, add* $\square$. *This gives the perfect square*

$$x^2 + bx + \square = (x + \square)^2.$$

5 (3 Points). *Fill in the blanks:*

A variable y *is a function of a variable* x *if each value of* _____ *corresponds to exactly* _____ *value of* _____.

6 (3 Points). *Expand the following product* $(a + b)(c + d)$

(a) using the distributive method.

(b) using FOIL.

2. Exercises

7 (20 Points)**.** *Consider the equation*

$$x^2 + 3y = 9.$$

(a) Does this equation define y as function of x? Briefly justify why or why not. If it does, give the value of y when $x = 3$.

(b) Does this equation define x as function of y? Briefly justify why or why not. If it does, give the value of x when $y = 5/3$.

8 (20 Points)**.** *Add the following rational expressions and simplify the result,*

$$\frac{2}{x^2 - 1} + \frac{1}{x + 1}.$$

9 (20 Points)**.** *Solve the equation*

$$2x^2 - 8x + 4 = 0.$$

10 (20 Points)**.** *Solve the inequality*

$$x^2 \geq 9.$$

Express the solution using interval notation and graph the solution.

11 (Bonus - 10 Points)**.** *Derive the Quadratic Formula, as stated in Exercise 3. [Hint: Use Exercise 4].*