Math 099 - Summer 2011 - Test 4

Instructor: Dr. Francesco Strazzullo   Name___*KEY*___

Instructions. Only calculators are allowed on this examination. Point values of each problem are indicated. **Always use the appropriate wording and units of measure in your answers (when applicable). SHOW YOUR WORK NEATLY, PLEASE** (no work, no credit).

1. (*15pts*) To accommodate some relatives at your next family reunion, you will have to pay $21 for each guest younger than 18 years (kids), and $35 for each adult (18 years and older). You have a budget of $3800. Let x be the number of kids and y the number of adults. Write a linear inequality to describe the possible numbers of each kind of guest you can accommodate.

"TOTAL COST" = "COST FOR KIDS" + "COST FOR ADULTS" = $21X + 35Y$ DOLLARS

"TOTAL COST" AT MOST EQUAL TO THE BUDGET, THAT IS:

$$21X + 35Y \le 3800$$

2. (*15pts*) Graph and show the solution set of the linear inequality $2x - y \ge 4$.

$2X - Y \ge 4$
$-2X \qquad -2X$

$-Y \ge -2X + 4$
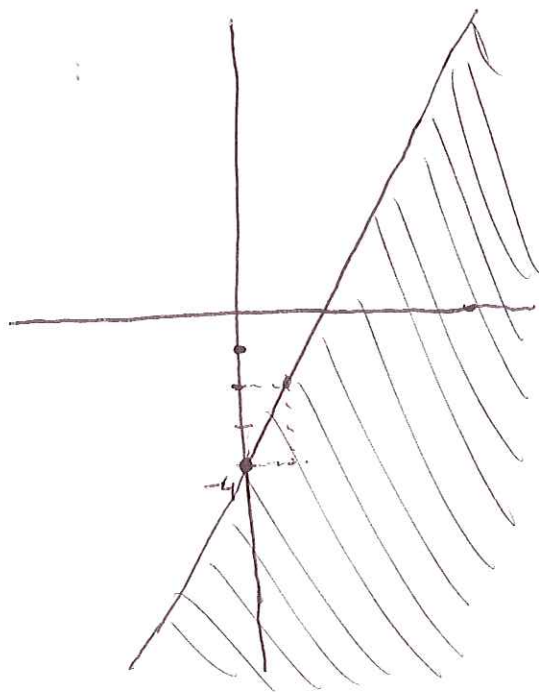$\dfrac{-Y}{-1} \le \dfrac{-2X}{-1} \dfrac{+4}{-1}$

$Y \le 2X - 4$

B.L.: $Y = 2X - 4$
                    $\searrow$ Y-INTERCEPT
        SLOPE $= \dfrac{2}{1}$

"$\le$" REGION BELOW

1

3. (10*pts*) Combine like terms of the following polynomial. Arrange the terms alphabetically, with exponents on the first variable in descending order.

$6y^2 - 4xy + x^2 + 6xy$

LIKE TERMS

$x^2 + (6-4)xy + 6y^2$

$x^2 + 2xy + 6y^2$

4. (10*pts*) Simplify the following expression using the scientific notation. Leave your answer in scientific notation. You must show your work and use a calculator at the same time.

$$\frac{(2.4\text{E}-7)\cdot(1.75\text{E}6)}{0.00125\cdot700,000} = \frac{2.4\times10^{-7}\cdot1.75\times10^{6}}{1.25\times10^{-3}\cdot7\times10^{5}} = \frac{(2.4)(1.75)\times10^{-7+6}}{(1.25)(7)\times10^{-3+5}}$$

$$= \frac{(2.4)(1.75)}{(1.25)(7)}\times10^{-1-(2)}$$

$$= .48\times10^{-3} = 4.8\times10^{-3-1}$$

$$= 4.8\times10^{-4}$$

2

5. Expand the following polynomials and combine like terms:

   (a) (15pts) $(x - 7)(4x + 5)$

   $$x(4x) + x(5) + (-7)4x + (-7)5$$

   $$4x^2 + 5x - 28x - 35$$

   $$4x^2 - 23x - 35$$

   (b) (10pts) $(2x - 3)^2$

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

   HERE $a = 2x$, $b = 3$

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

   $$= 4x^2 - 12x + 9$$

6. Factor the following polynomials:

(a) (15pts) $3x^2 + 10x - 8$

$$\text{PRODUCT} = 3 \cdot (-8) = -24 \xrightarrow{\text{FACTORS}} \underline{-2, 12}$$

$$\text{SUM} = 10 \qquad\qquad 12 + (-2) = 10$$

$$3x^2 + 12x - 2x - 8$$

$$3x(x+4) - 2(x+4)$$

$$(x+4)(3x-2)$$

CHECK: FOIL $\quad 3x^2 - 2x + 12x - 8 \quad \checkmark$

(b) (10pts) $9x^2 - 25$

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

HERE $\quad a = 3x \quad , \quad b = 5$

$$9x^2 - 25$$

$$(3x)^2 - (5)^2$$

$$(3x+5)(3x-5)$$

4