College Mathematics, Exam 2, V Practice, Spring 2013 NAME: Key
Camp Lemonnier, Djibouti

Answer the following questions in the space provided. If you need more room, write "BACK," and use the back of the sheet. For full credit, show all of your work, demonstrating an understanding of material covered in our course. Reduce any fractions, and simplify any radicals. You have 50 minutes. Good luck!

1. Professor G. O. Metry has a drawer full of plane figures. These figures are either squares (four sides each) or triangles (three sides each). He has fifteen figures, and there are a total of 56 sides. How many squares and how many triangles does he have?

a. (3 points) Describe a problem solving strategy that would be effective for solving this problem.

① Use algebra - two variables, two equations.

Or ② guess & figure out

b. (6 points) Use the strategy you named to solve the problem.

Strategy 1:

15 figures, 56 sides

t = # triangles, $3t$ = # sides

s = # squares, $4t$ = # sides

$s + t = 15$ $\quad 4s + 3t = 56$

$s = 15 - t$

$4(15-t) + 3t = 56$

$60 - 4t + 3t = 56$

$-t = -4$, $t = 4$

$t = 4$

$s = 15 - t = 11$

Tri: 4

Sq: 11

Method 2:

Guess! Lets say 7t and 8s

7t: 21 sides

8s: 32 sides

53 sides not enough!

Need more squares. We get one side extra per square

So, we need 3 more squares, and 3 fewer triangles.

4t: 12 sides

11s: 44 sides

56 sides ✓

c. (3 points) Answer the question.

4 triangles

11 squares

2. (8 points each). Evaluate the following algebraic expressions for the indicated value of the variable.

a. $3x^2 - 2x + 5, \quad x = -3$

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

$3(9) - -6 + 5$

$27 + 6 + 5$

$33 + 5$

38

b. $\frac{12}{p} - (p-2)^2, \quad p = 4$

$\frac{12}{4} - (4-2)^2$ $\quad 3 - 2^2$ $\quad 3 - 4$ $\quad -1$

3. (8 points) Simplify the algebraic expression. $3[4x^2 - 2x] - 5[2x + 7]$

$12x^2 - 6x - 10x - 35$

$12x^2 - 16x - 35$

4. (8 points) List the terms of the algebraic expression. $7x^3 - 5x^2 + 2x - 6$

$7x^3$

$-5x^2$

$2x$

-6

5. (8 points) Solve the linear equation and check the solution. $3x - 5 = -11$

$3x - 5 = -11$

$+5 \quad +5$

$\frac{3x}{3} = \frac{-6}{3}$

$x = -2$

Check:

$3(-2) - 5 \stackrel{?}{=} 11$

$-6 - 5 \stackrel{?}{=} 11$

$11 \stackrel{\checkmark}{=} 11$

6. (8 points) Solve the proportion. $\frac{2x}{5} = \frac{6}{10}$

Cross multiply: $20x = 30$

$\frac{20x}{20} = \frac{30}{20}$

$x = \frac{30}{20} = \frac{3}{2}$

Check:

$\frac{2(\frac{3}{2})}{5} = \frac{6}{10}$

$\frac{3}{5} = \frac{6}{10}$ $\frac{3}{5} = \frac{3}{5}$ ✓

7. (8 points) Pamela bought a new car for $35,000. Its value is decreasing by $4,200 per year. After how many years will its value be $24,600? Give your answer to the nearest half-year.

y = # of years

$35000 - 4200y = 24600$

$-35000 \quad -35000$

$-4200y = -10400$

$\frac{-4200y}{-4200} = \frac{-10400}{-4200}$

$y = 2.48$ years $\approx$ 2.5 years

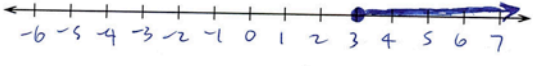
8. (8 points) Solve the inequality, express the solution set in set builder notation, and graph the solution set on a number line.

$3x + 7 \geq 16$

$-7 \quad -7$

$\frac{3x}{3} \geq \frac{9}{3}$

$x \geq 3$



9. (8 points) Multiply. Combine any like terms in the product. $(2x - 11)(3x + 4)$

F O I L : $6x^2 + 8x - 33x - 44$

$6x^2 - 25x - 44$

10. (8 points) Solve the equation by factoring. $x^2 - 3x - 28 = 0$

-28

-1×28 $\quad 1 \times -28$

-2×14 $\quad 2 \times -14$

-4×7 $\quad 4 \times -7$

need (-3) : 4×-7 when added

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

Steps: $(\quad)(\quad)$

$(x \quad)(x \quad)$

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

check: FOIL : $x^2 - 7x + 4x - 28$ $\quad x^2 - 3x - 28$ ✓

11. (8 points) Solve the equation using the quadratic formula. $3x^2 - 10x = -4$

First: put into standard form: $3x^2 - 10x = -4$

$+4 \quad +4$

$3x^2 - 10x + 4 = 0$

$a \quad b \quad c$

Quad: $\dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Plug in: $x = \dfrac{-10 \pm \sqrt{(-10)^2 - 4(3)(4)}}{2(3)} = \dfrac{-10 \pm \sqrt{+100 - 48}}{6} = \dfrac{-10 \pm \sqrt{52}}{6}$