Department of Mathematics, University of Wisconsin-Madison

Math 101 Test #2
Spring 2010

NAME: _____

INSTRUCTOR: _____

INSTRUCTIONS:

Time: **1 hour 15 minutes**
You **must show your work** to receive credit.
Problems involving fractions should be solved using fractions not decimals.

You might need the following formulas:

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

Area of triangle: $A = \frac{1}{2}bh$
Area of a circle: $A = \pi r^2$
Area of a rectangle: $A = lw$

Problem	Value	Score
1	12	
2	30	
3	16	
4	28	
5	14	
TOTAL	100	

1. (12 points) Solve the following system of equations:

(a) $-4x + 9y = 19$ and $3x - 4y = -17$

(b) $4x - y = 4$ and $-8x + 2y = 4$

2. (30 points) Perform the following operations and simplify as much as possible.

   (a) Multiply: $-5a^5c^2(4c^4 + 9a - 6)$

   (b) Multiply: $(-3x - 4)^2$

   (c) Divide: $(20x^3 + 16x^2 + 6x + 6) \div (5x - 1)$

   Your answer should give the quotient and the remainder.

(d) Divide: $\frac{p-\frac{p+2}{4}}{\frac{3}{4}-\frac{1}{2p}}$

(e)Add and Subtract: $\frac{4x+1}{x+5} - \frac{2}{x} + \frac{10}{x^2+5x}$

(f)Divide $\frac{k^2-4}{3k^2} \div \frac{2-k}{11k}$

3. (16 points)Solve the following word problems. You must use algebra to solve. Trials and Errors will not be accepted.

(a) A sign has the shape of a triangle. The length of the base is 3 m less than the height. If the area is 20 m^2, what are the measures of the base and the height?

(b)The amount of pollution entering the atmosphere varies directly as the number of people living in an area. If 800 people cause 568 tons of pollutants, how many tons enter the atmosphere in a city with a population of 5,000?

4. (28 points) Factor completely.

(a) $11z^2 - 44z$

(b) $3x + by + bx + 3y$

(c) $-2x^2 - x + 36$

(d) $9k^2 - 49t^2$

(e) $27x^6 + 1$

(f)$32w^2 - 2w^2z^4$

(g) Which of the following is NOT a factored form of $-x^2 - x + 12$?

A. $(3 - x)(x + 4)$
B. $-(x - 3)(x + 4)$
C. $(-x + 3)(x + 4)$
D. $(x - 3)(-x + 4)$

5. (14 points) Solve.

(a) $\frac{2}{x+2} + \frac{x}{3} = \frac{6}{3x+6}$

(b) $\frac{1}{x-5} = \frac{x-3}{3}$