

Math 101

March 29'th, 2005

## Exam 2

Name: \_\_\_\_\_ Instructor and Section: \_\_\_\_\_

There are 100 possible points on this exam. Be sure to read each question carefully and answer the question asked. Show your work neatly and clearly—untidy answers and/or answers without justification may reduce your score. Partial credit may be given for a correct approach even if you don't get to the right answer. Give exact answers unless otherwise asked.

No calculators are allowed

**GOOD LUCK!**

Problem	Max	Score
1	14	
2	12	
3	10	
4	10	
5	8	
6	8	
7	10	
8	16	
9	12	
EC	5	
TOTAL	100	

1. (14 points) Solve the following systems of linear equations. If the system is dependent or inconsistent, say so.

(a)

$$\begin{cases} 3x - y = 2 \\ 6x = 3 + 2y \end{cases}$$

(b)

$$\begin{cases} 2x + y = 7 \\ 2y - 3x = -10 \end{cases}$$

2. (12 points)

(a) Simplify the following

i.  $\frac{(3^{-2})^{-2}}{(-3)^3}$

ii.  $\frac{(-x^{-1})^{-4}}{(x^{-2})^{-2}(-x)^{-1}}$

(b) Simplify the following expression so that no negative exponents appear in the final result and no variable appears more than once.

$$\frac{(2x^{-2})^3(-2x^{-1}y^2)^2(3xy^{-2})^4}{(2x^2y)^3(3^{-2}x^{-1}y^2)^2}$$

3. (10 points)

(a) Find the product  $(x^2 - x + 1)(x^2 + x + 1)$

(b) Find the result with remainder of dividing  $4x^4 + x^3 - 3x^2 + 3$  by  $x^2 + 1$

4. (10 points) Given the polynomials:  $x^5 - 3x^4 + 3x^3 - 2x^2 + 1$  and  $x^5 - 3x^4 + 2x^2 - 1$ .

(a) Find the sum and the difference of the two polynomials.

(b) What is the degree of the sum and what is the degree of the difference?

5. (8 points) Tickets to a production of King Lear at Broward Community College cost \$5 for general admission or \$4 with a student ID. If 184 people paid to see the performance and \$812 was collected, how many of each type of ticket were sold?

6. (8 points) Travelling for 4 hr into a steady headwind, a plane flies 2000 mi. The pilot determines that flying with the same wind for 2 hr, he could make a trip of 1400 mi. Find the speed of the plane and the speed of the wind.

7. (10 points) Which ones of the following are polynomials and which are not? Justify your answer:

(a)  $\frac{1}{2} + x^2 - \frac{x}{y}$

(b)  $x^3 + 3x^2 + \frac{x}{2}$

(c)  $x^{-1}y^2 - y^4x^3$

(d)  $(x - 1)(x^2 - x + 1)$

(e)  $x^3 + x^2 + x + 1 + x^{-1} + x^{-2} + x^{-3}$

8. (16 points) Factor each of the following completely.

(a)  $(x - 2)^2 - 2(2 - x)$

(b)  $x^2y^2 - x^2 - 4y^2 + 4$

(c)  $9x^2 - 1$

(d)  $x^2 + x - 6$

9. (12 points) Factor the following polynomials into prime factors:

(a)  $x^2 + x + 8$

(b)  $6x^2 + x - 2$

(c)  $3x^2 - 10x + 8$

10. EXTRA CREDIT (5 points) Factor the following polynomial into prime factors:

$$x^2y^2 - y^2 + 2x^2y + x^2 - 2y - 1$$