

Math 101

May 10th, 2005

## Final Exam

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

There are 200 possible points on this exam and 20 extra credit points. 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	40	
2	56	
3	24	
4	10	
5	15	
6	15	
7	15	
8	15	
9	10	
TOTAL	200	
EC	20	

1. Simplify the following expressions. (Give exact values and put all fractions in lowest terms.)

(a) (8 points)  $12\left(\frac{4\sqrt{9}-2|1-6|}{6}\right)$

(b) (8 points)  $\frac{(-x^{-1})^{-4}}{(x^{-2})^{-2}(-x)^{-1}}$

(c) (8 points)  $\frac{1}{x-1} + \frac{1}{x-x^2}$

(d) (8 points)  $(8^{\frac{3}{2}})^{-\frac{2}{9}}$

(e) (8 points)  $(-8)^{-2/3}$

2. Solve the following equations:

(a) (8 points)  $\frac{2x+5}{5} = \frac{3x+1}{2} + \frac{-x+7}{2}$

(b) (8 points)

$$\begin{cases} 2x + y = 7 \\ 2y - 3x = 0 \end{cases}$$

(c) (8 points)  $\sqrt{9-x} = x+3$

(d) (8 points)  $\sqrt{3x-2} - \sqrt{x+3} = 1$

(e) (8 points)  $2x^2 - 3x = 1$

(f) (8 points)  $49x^2 - 126x + 81 = 4$

3. Factor the following polynomials into prime factors:

(a) (8 points)  $6x^2 - 11x + 3$

(b) (8 points)  $8x^3 - 1$

(c) (8 points)  $x^2y^2 - x^2 - 4y^2 + 4$

4. (a) (10 points)
- (b) Write down an equation for the line which contains the points  $(3,1)$  and  $(1,2)$ . Clearly state the slope of this line.
- (c) What are the  $x$  and  $y$  intercepts of this line?
- (d) Write down the equations for the lines parallel and perpendicular to this one that pass through the point  $(2, 2)$ .

5. (15 points) At O'Hare International Airport in Chicago, Cheryl and Bill are walking to the gate (at the same speed) to catch their flight to Akron, Ohio. Since Bill wants a window seat, he steps onto the moving sidewalk and continues to walk while Cheryl uses the stationary sidewalk. If the sidewalk moves at 1 m per sec and Bill saves 50 sec covering the 300 m distance, what is their walking speed?