

Math 101

May 4, 2003

Exam 3

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	20	
2	20	
3	24	
4	12	
5	12	
6	12	
TOTAL	100	

1. (20 points) Simplify the following rational expressions. Your answer should be a single simple fraction in lowest terms.

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

(b) $\frac{\frac{3}{2x} - \frac{x-1}{x^2}}{\frac{1}{x} + \frac{x}{4}}$

$$(c) \quad \frac{x^2 - 5x}{6x} \cdot \frac{8}{10 - 2x}$$

$$(d) \quad \frac{6x^5y^{-3}}{10y^4} \div \frac{21x^{-2}y^6}{9x^3y^{-1}}$$

2. (20 points) Simplify the following expressions. Your answers should involve no negative exponents and no radicals in the denominators.

Assume that $x > 0$ and $y > 0$.

(a) $4^{-3/2}$

(b) $\frac{5\sqrt[3]{25}}{\sqrt[5]{5}}$

(c) $\frac{x - y}{\sqrt{x} + \sqrt{y}}$

(d) $(\sqrt[4]{9} + \sqrt[4]{4})(\sqrt[4]{9} - \sqrt[4]{4})$

3. (24 points) Find all solutions, if any, to each of the following equations.

(a) $\frac{4}{x} + \frac{x}{2} = \frac{x+8}{2x}$

(b) $\sqrt{x+3} = x+3$

$$(c) \quad \sqrt{x+4} - \sqrt{x+2} = -2$$

$$(d) \quad x + \frac{2}{x} = 3$$

4. (12 points) Driving from Tulsa to Detroit, Jeff averaged 50 mph. He figured that if he had averaged 60 mph, his driving time would have decreased by 3 hr. How far is Tulsa from Detroit?

5. (12 points) The area of a trapezoid is given by:
 $A = \frac{1}{2}h(B + b)$ where B , b and h are the length of the 2 bases and the height of the trapezoid.

(a) Find a formula that gives b as a function of A , h and B .

(b) Find b when $A = 15$, $h = 5$, and $B = 4$

6. (12 points) A winery has a vat to hold chardonnay. An inlet pipe can fill the vat in 6 hr, while an outlet pipe can empty it in 18 hr. How long will it take to fill the vat if both pipes are open?