Math 100 Exam I
7:30pm–8:30pm, Tuesday September 9, 2003

Recitation Instructor: ____________________       Your Name: ____________________

Recitation Day/Time: ____________________       Your Calculator Model: __________

No books or notes are allowed. Please read the problems carefully and do all you are asked to do. You must show your work! You can use the back page as scratch paper and do the problems at the space provided.

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1. (10pts) Simplify to get an answer with non-negative exponents only.
   (a). $ (2s^{-2})^5 = $
   (b). $ \left(\frac{-x^{-2}y^3}{x^{-1}y^1}\right)^{-3} = $

2. (10pts) Multiply the polynomials.
   (a). $(4x^4y - 7x^2y^3)(2 - 3x^2y^2) =$
   (b). $(y - 2)(y + 2)(y^2 + 4) =$

3. (10pts) Factor into polynomials with real coefficients.
   (a). $x^3 - 3x^2 - 5x + 15 =$
   (b). $6x^2 - 7x - 20 =$
4. (10pts) Perform the operations and simplify your answer into lowest terms.

(a) \( \frac{4x^3 + 16x^2}{2x^3 + 6x^2 - 8x} = \)

(b) \( \frac{a^2 - a - 2}{a^2 - a - 6} \div \frac{a^2 - 2a}{2a + a^2} = \)

5. (5pts) Perform the operation and simply your answer.

\[
\frac{x}{x^2 + 11x + 30} - \frac{5}{x^2 + 9x + 20} =
\]

6. (10pts) Simplify. All variables are real numbers, in particular, they could be negative numbers.

(a) \( \sqrt{36t^2} = \)

(b) \( \sqrt[3]{-8y^3} = \)

7. (10pts) Perform the operation and simplify. All variables are assumed to be positive.

(a) \( \sqrt[4]{8x^3y^4} \cdot \sqrt[4]{4x^3y} = \)

(b) \( \sqrt[8]{16n^{24}} = \)
8. (5pts) Simplify and convert your answer to radical notation

\((3a^2)(8a^3) =\)

9. (5pts) Rationalize the denominator \(\frac{5}{\sqrt{y} - s\sqrt{x}} =\)

10. (5pts) Compute the distance and the midpoints between the two points \((-7, -4)\) and \((-1, 3)\).

11. (5pts) Write an equation for the circle which has center \((-5, 6)\) and passes through the point \((1, 7)\).

12. (5pts) Write an irrational number between \(-0.124\) and \(-0.123\) and explain why your number is irrational.

13. (10pts) For \(y = x^3 - 102x^2 + 103x - 202\).

(a). Use your calculator to plot the graph and indicate the window setting on your graph

(b). find an value of \(x\) such that \(y = 0\) up to 3 decimal places.