Math 1010 - Exam 3

University of Utah

Fall 2009

Name: _____

1. Factor the following polynomials:

   (a) $12x^2 + 6x$ (3 points)

   (b) $9u^2 - v^2$ (4 points)

   (c) $x^2 - 10x + 24$ (4 points)

   (d) $3z^2 - z - 4$ (4 points)

2. What is the domain of the rational function: (5 points)

$$\frac{x^2 + 2x}{x^2 - 2x - 3}$$

3. Simplify the rational function: (5 points)

$$\frac{z^2 + 22z + 121}{3z + 33}$$

4. Calculate the following and simplify: (Be sure to state the domains)

(a) $18x^4 \cdot \dfrac{4}{15x}$ (4 points)

(b) $\dfrac{x^3 - 4x + 7}{x - 1}$ (Hint: Synthetic Division) (7 points)

5. Solve the following equations: (In other words, find the value of x that makes the equation true.)

   (a) $\dfrac{x-4}{9} - \dfrac{3x+1}{18} = \dfrac{3}{2}$ (9 points)

(b) $\dfrac{5}{x+2} + \dfrac{2}{x^2 - 6x - 16} = -\dfrac{4}{x-8}$ (9 points)

6. Simplify the expressions:

(a) $8^{-\frac{2}{3}}$ (5 points)

(b) $\sqrt{120x^2y^3}$ (5 points)

7. Calculate and simplify: (Note: In some you may just need to simplify.)

   (a) $\sqrt{45x} + 3\sqrt{20x}$ (4 points)

   (b) $\dfrac{7}{\sqrt{3}+5}$ (5 points)

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

8. Express as a complex number in simplest form:

(a) $\sqrt{-49}$ (2 points)

(b) $\sqrt{-9} + \sqrt{-1}$ (3 points)

(c) $\dfrac{6i+3}{3i}$ (5 points)

9. Find the roots of the following trinomials: (In other words, solve the following equations.)

   (a) $x^2 + 3x + 2 = 0$ (5 points)

   (b) $x^2 - 2x - 4 = 0$ (8 points)