Math 154 -- Elementary Algebra
M. Eastman -- Sample Test 4 -- Chapters 7, 8

The following problems are a sample of the types of problems that will be on the test; the sections where these problems occur is listed. The actual test will contain more problems than this sample test.

1. The length of a rectangle is one inch more than three times the length. This problem will find the dimensions of the rectangle. (section 7.7)

   a. Find expressions for the width and the length of the rectangle that are written in terms of a single variable x.

   b. Suppose the area of the rectangle is 80 square inches. Write an equation using the expressions from part a. that yields this area.

   c. Solve the equation in part b. to find the dimensions of the rectangle.

2. Simplify: (section 8.1)

   a. $\dfrac{18x-2x^2}{x^2-6x-27}$ b. $\dfrac{x^2-10x-24}{x^2-4x-12}$

3. List all values of x for which the rational expression is undefined. $\dfrac{x^2-25}{x^2-5x-6}$ (section 8.1)

4. Do the indicated operations; simplify your answer. (section 8.2)

   a. $\dfrac{x^2-6x+8}{x^2-4} \cdot \dfrac{16x-4x^2}{2x^2-16x+32}$ b. $\dfrac{x^2-2x-3}{2x^2-x-15} \div \dfrac{x^2-5x-6}{2x^2+x-10}$

5. Do the indicated operations; simplify your answers. (section 8.3, 8.4)

   a. $\dfrac{4x+3}{x^2+2x-15} - \dfrac{x+12}{x^2+2x-15}$ b. $\dfrac{x+1}{x-2} + \dfrac{15}{x^2-9x+14}$

6. Simplify: (section 8.5)

$$\frac{\frac{3x}{4}-\frac{4}{3x}}{\frac{2}{3x}-\frac{1}{2}}$$

7. Solve for x: $\dfrac{2}{x-4} = \dfrac{x+4}{x^2-4x} + \dfrac{x-2}{x}$ (section 8.6)

8. On Monday, Jane drove 100 miles at a certain speed. On Tuesday, she went 120 miles traveling at twice the speed she drove on Monday. The total time she spent in her car (on Monday and Tuesday) was 4 hours. What was her speed on both Monday and Tuesday? You should fill in the table and find the correct rational equation to receive full credit. (section 8.7)

ANSWERS

1. a. width $= x$, length $= 3x + 1$

   b. $x(3x + 1) = 80$

   c. width $= 5$", length $= 16$"

2. a. $-\frac{2x}{x+3}$ b. $\frac{x-12}{x-6}$

3. $x \neq 6, -1$

4. a. $-\frac{2x}{x+2}$ b. $\frac{x-2}{x-6}$

5. a. $\frac{3}{x+5}$ b. $\frac{x-4}{x-7}$

6. $-\frac{3x+4}{2}$

7. $x = 3\,(x \neq 4)$

8.

	Distance	Rate	Time
Monday	100	x	$\frac{100}{x}$
Tuesday	120	$2x$	$\frac{120}{2x}$

   equation: $\frac{100}{x} + \frac{120}{2x} = 4$

   Monday: 40 mph, Tuesday: 80 mph