

MATH 103
 SPRING 2012
 EXAM 3

NAME:

1. 10 pts. each Write in lowest terms.

(a) $\frac{4x^2y + 12xy + 18x^3y^3}{8xy^2}$

(b) $\frac{w^2 - 3w - 10}{w^2 + 5w + 6}$

2. 10 pts. each Multiply or divide as indicated, and write in lowest terms.

(a) $\frac{x+1}{x^2-7x-8} \cdot \frac{x^2-x-56}{x^2+9x+14}$

(b) $\frac{5a+10b}{a^2-4b^2} \div \frac{a^3+a^2b}{a^2-2ab}$

3. 10 pts. each Add or subtract as indicated, and write in lowest terms.

(a) $\frac{g+1}{2g} + \frac{3}{4g+8}$

(b) $\frac{1}{r^2-r-6} - \frac{1}{r^2-4}$

4. 10 pts. Simplify the complex fraction:

$$\frac{\frac{3}{u} - \frac{1}{u^2}}{5 + \frac{5}{u^2}}$$

5. 10 pts. each Solve each equation.

(a) $\frac{y-3}{y+1} = \frac{y-6}{y+5}$

(b) $\frac{2}{c-5} = \frac{22}{2c^2-9c-5} - \frac{3}{2c+1}$

6. 10 pts. Solve $S = \frac{a}{1-r}$ for r .

7. 15 pts. Lord Umberbottom lives in a flat in London. Some days he rides his penny-farthing to the pub at Piccadilly Circus, while other days he walks. When he rides his pennyfarthing, he gets to the pub 36 minutes faster than when he walks. If his average walking speed is 3 mph and his average riding speed is 12 mph, how far is it from his flat to the pub?

8. 10 pts. Curly, Larry, and Moe are experts (or so they say) at installing windows in houses. Curly can install five windows in a house in 10 hours, Larry can do the same job in 8 hours, and Moe can do it in 6 hours. If all three men work together, how long will it take them to install the windows?

9. 10 pts. each Solve each system of equations. If the system is inconsistent or has dependent solutions, say so.

(a)
$$\begin{cases} 3x - 2y = 7 \\ 2x + y = 3 \end{cases}$$

(b)
$$\begin{cases} \frac{1}{4}x - \frac{1}{5}y = 9 \\ 5x - y = 0 \end{cases}$$

10. 10 pts. Simplify the root $\sqrt[3]{x^{15}}$.

11. 10 pts. each Simplify each expression. Write all answers with positive exponents. Assume that all variables represent positive real numbers.

(a) $4z^{5/3} \cdot 2z^{-7/2}$

(b) $\left(\frac{x^{-1/3}}{x^{-2}}\right)^2$