MATH 103
SPRING 2014 NAME:
EXAM 3

1. $\boxed{\text{10 pts. each}}$ Write in lowest terms.

   (a) $\dfrac{8x^2 - 10x - 3}{8x^2 - 6x - 9}$

   (b) $\dfrac{r^3 - s^3}{r - s}$

2. $\boxed{\text{10 pts. each}}$ Multiply or divide as indicated, and write in lowest terms.

   (a) $\dfrac{a^2 - 1}{4a} \cdot \dfrac{2}{1 - a}$

   (b) $(8y - 16) \div \dfrac{3y - 6}{10}$

3. $\boxed{\text{10 pts. each}}$ Add or subtract as indicated, and write in lowest terms.

   (a) $\dfrac{3}{z - 3} - \dfrac{1}{z}$

   (b) $\dfrac{4}{w + 3} - \dfrac{w}{w - 3} - \dfrac{18}{w^2 - 9}$

4. $\boxed{\text{10 pts.}}$ Simplify the complex fraction:

$$\frac{q - \dfrac{q - 3}{3}}{\dfrac{4}{9} + \dfrac{2}{3q}}$$

5. $\boxed{\text{10 pts. each}}$ Solve each equation.

   (a) $p + \dfrac{15}{p} = -8$

   (b) $\dfrac{5}{t} + \dfrac{4}{6 - 3t} = \dfrac{2t}{6 - 3t}$

6. $\boxed{\text{10 pts.}}$ Solve for n: $I = \dfrac{nE}{R + nr}$.

7. $\boxed{\text{10 pts.}}$ Krang and Shredder mow lawns during the summer months. Using a self-propelled hand mower, Shredder can mow a large lawn in 5 hours. Using a riding mower, Krang can mow the same lawn in 3 hours. How long will it take them working together to mow the lawn?

8. $\boxed{\text{10 pts.}}$ If a vat of acid can be filled by an inlet pipe in 10 hours and emptied by an outlet pipe in 14 hours, how long will it take to fill the vat if both pipes are open?

9. $\boxed{\text{10 pts. each}}$ Solve each system of equations. If the system is inconsistent or has dependent solutions, say so.

(a)
$$\begin{cases} 3x + 2y = 13 \\ 4x - y = -1 \end{cases}$$

(b)
$$\begin{cases} \frac{1}{2}x + \frac{1}{3}y = 3 \\ -3x + y = 0 \end{cases}$$

10. $\boxed{\text{10 pts.}}$ Simplify the root $\sqrt[4]{w^{28}}$.

11. $\boxed{\text{10 pts.}}$ Write with radicals: $(2m)^{-3/2}$.

12. $\boxed{\text{10 pts. each}}$ Simplify each expression. Write all answers with positive exponents. Assume that all variables represent positive real numbers.

(a) $b^{2/3} \cdot b^{-1/6}$

(b) $\dfrac{c^{1/6}h^{-5/6}}{(c^3h)^{1/3}}$

FORMULAS:
$A^3 + B^3 = (A + B)(A^2 - AB + B^2)$
$A^3 - B^3 = (A - B)(A^2 + AB + B^2)$