MATH 103
SPRING 2012
EXAM 4

NAME:

1. [10 pts. each] Simplify. Assume all variables represent positive numbers.

   (a) $\sqrt{27}$

   (b) $\sqrt[3]{54w^3y^5}$

   (c) $\sqrt{\dfrac{r^3}{64}}$

   (d) $3\sqrt{75} + 13\sqrt{48}$

2. [10 pts.] Multiply, then simplify the product:

$$\left(2\sqrt{3} + \sqrt{2}\right)\left(2\sqrt{3} - \sqrt{2}\right)$$

3. [10 pts. each] Rationalize the denominator in each expression. Assume variables represent positive numbers.

   (a) $\dfrac{8}{\sqrt{24}}$

   (b) $\dfrac{1}{3 - \sqrt{b}}$

4. [10 pts. each] Solve each charming little radical equation.

   (a) $\sqrt{9 - x} = x + 3$

   (b) $\sqrt[3]{2z - 1} = \sqrt[3]{z - 11}$

5. [10 pts. each] Perform the indicated operation, writing all answers in the form $a + bi$.

   (a) $(9 - 10i) - (5 + 3i)$

   (b) $3i(4 + 7i)$

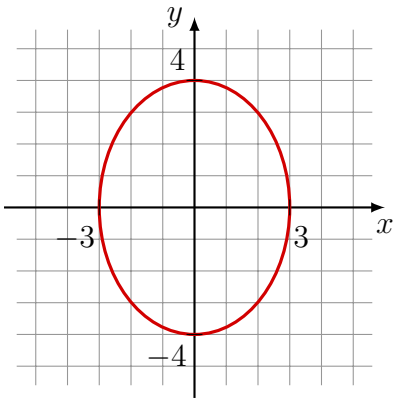
   (c) $\dfrac{3 - i}{1 - i}$

6. [10 pts. each] Solve each enchanting little quadratic equation using the quadratic formula.

   (a) $x^2 - 4 = 2x$

   (b) $9x^2 - 6x = -7$

7. [10 pts.] Determine whether the relation given by the graph below defines a function, and give the domain and range.



8. [10 pts.] Decide whether the relation

$$y = \sqrt{4x + 2}$$

   defines y as a function of x, and give the domain.

9. [10 pts.] Let $f(x) = 3x - 1$ & $g(x) = x^2 + 5x$. Find $f(-3)$ and $g(-3)$.