MATH 103
FALL 2013 NAME:
EXAM 4

1. [10 pts. each] Simplify. Assume all variables represent positive numbers.
   (a) $\sqrt{500}$
   (b) $\sqrt{121x^2y^7}$
   (c) $\sqrt[3]{54t^6z^4}$
   (d) $\sqrt{\dfrac{u^3}{81}}$
   (e) $3\sqrt{8} + 13\sqrt{72} - 3\sqrt{18}$

2. [10 pts.] Multiply, then simplify the product:
$$\left(2\sqrt{3} + \sqrt{5}\right)\left(2\sqrt{3} - \sqrt{5}\right)$$

3. [10 pts. each] Rationalize the denominator in each expression. Assume variables represent positive numbers.
   (a) $\dfrac{8}{\sqrt{24}}$
   (b) $\dfrac{3}{2 - \sqrt{a}}$

4. [10 pts. each] Solve each charming little radical equation.
   (a) $\sqrt{9 - x} = x + 3$
   (b) $\sqrt[3]{2y - 1} = \sqrt[3]{y + 13}$

5. [10 pts.] Multiply, then simplify the product:
$$\sqrt{-7} \cdot \sqrt{-15}$$

6. [10 pts.] Find i^{115}.

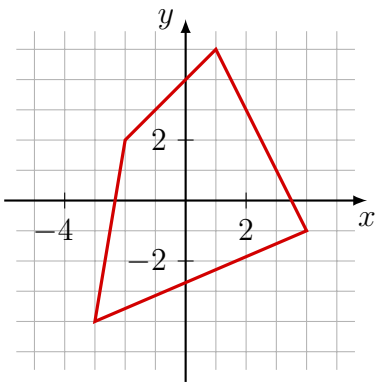
7. [10 pts. each] Subtract, multiply or divide the complex numbers as indicated, and write your answers in the form $a + bi$.
   (a) $(9 + 11i) - (5 + 6i)$
   (b) $3i(4 - 9i)$
   (c) $\dfrac{3 - i}{1 - i}$

8. [10 pts. each] Solve each enchanting little quadratic equation using the quadratic formula.

   (a) $(x-3)(x+4)=2$

   (b) $x^2+4x+9=0$

9. [10 pts.] Determine whether the relation given by the graph below defines a function, and give the domain and range.



10. [10 pts.] Decide whether the relation $2x-y<3$ defines y as a function of x, and give the domain.