HOMEWORK 9 - MATH 102
DUE DATE: Monday, December 4
INSTRUCTOR: George Voutsadakis

Read each problem **very carefully** before starting to solve it. Four out of the eight problems will be chosen at random and graded. Each problem graded is worth 3 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Rationalize the denominators:

   (a) $\sqrt{\frac{7}{32ab}}$

   (b) $\sqrt[3]{\frac{3}{9x^6}}$

2. Add, subtract, or multiply, as appropriate:

   (a) $\sqrt{75} + 7\sqrt{12}$

   (b) $\sqrt[3]{24} - \sqrt[3]{81}$

   (c) $(3\sqrt{6} - 4\sqrt{3})(4\sqrt{6} + 7\sqrt{3})$

3. Rationalize the denominators:

$$(a)\ \frac{2 + \sqrt{5}}{\sqrt{3}} \quad (b)\frac{6}{5 - \sqrt{2}}$$

4. Solve the following radical equations:

   (a) $\sqrt{x - 5} - x = -7$

   (b) $\sqrt{x - 3} + \sqrt{2x - 1} = 2\sqrt{x}$

5. Perform the indicated operations with complex numbers:

   (a) $(3 + \sqrt{-4}) - (5 - \sqrt{-9})$

   (b) $\sqrt{-9}(2 + 5i)$

   (c) $\frac{5+3i}{7-3i}$

6. Solve the following quadratic equations by completing the square:

   (a) $x^2 - 10x + 24 = 0$

   (b) $2x^2 + 3 = 6x$

   (c) $2x^2 + 12x + 18 = 27$

7. Use the quadratic formula to solve the equations:

   (a) $x^2 - 4x = 12$

   (b) $6x = 9x^2 - 4$

   (c) $\frac{x^2}{12} = -\frac{x}{4} - \frac{1}{3}$

8. Determine the value of k that will make the following equation have exactly one rational solution:

   (a) $2kx^2 - 12x = -9$

   (b) $4x^2 + 9kx = -1$