MA 103 Solving Quadratic Equations
Sections 8.1, 8.2

I. Using the Principle of Square Roots; Completing the Square

1. The generalized principle of square roots states that for any real number k, if $X^2 = k,\ \textit{then}\ \ X = \pm\sqrt{k}$, where X is an algebraic expression.

   Use this principle to solve each of the following equations. Answers involving square roots of negative numbers should be written in the form $a + bi$.

(a) $6x^2 = 13$	(b) $x^2 = -16$
(c) $(x-3)^2 = 17$	

2. Use the method of completing the square and the generalized principle of square roots to solve each of the following problems.

(a) Solve the equation: $x^2 + 8x + 3 = 0$	(b) Solve the equation: $2x^2 - 10x - 1 = 0$

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(c) Find the x-intercepts of the function $f(x) = x^2 - 4x - 7$

II. **Using the Quadratic Formula**

Any quadratic equation $ax^2 + bx + c = 0,\ a \neq 0$, can be solved using the quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

3. Use this formula to solve each of the following problems. Write answers in exact form (using radicals). For any answer involving real numbers, use your calculator to approximate the answer correct to three decimal places. Any answer involving square roots of negative numbers should be written in the form $a + bi$.

(a) Solve the equation: $2x^2 - 3x - 7 = 0$

(b) Solve the equation: $x^2 - 5x + 7 = 0$

(c) Let $f(x) = \frac{x+2}{x}$ and $g(x) = \frac{x-4}{2}$. Find all x such that $f(x) = g(x)$.