





$$42. 9x^2 - 12x = 14$$

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In Exercises 45–50, rewrite the quadratic portion of the algebraic expression as the sum or difference of two squares by completing the square.

$$46. \frac{1}{x^2 - 12x + 19}$$

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*Graphical Analysis* In Exercises 51–58, use a graphing utility to graph the equation. Use the graph to approximate any  $x$ -intercepts of the graph. Set  $y = 0$  and solve the resulting equation. Compare the result with the  $x$ -intercepts of the graph.

$$54. y = 9 - (x - 8)^2$$

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**The Quadratic Formula**

The solutions of a quadratic equation in the general form

$$ax^2 + bx + c = 0, \quad a \neq 0$$

are given by the **Quadratic Formula**

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

**Solutions of a Quadratic Equation**

The solutions of a quadratic equation  $ax^2 + bx + c = 0, a \neq 0$ , can be classified as follows. If the discriminant  $b^2 - 4ac$  is

1. *positive*, then the quadratic equation has *two* distinct real solutions and its graph has *two*  $x$ -intercepts.
2. *zero*, then the quadratic equation has *one* repeated real solution and its graph has *one*  $x$ -intercept.
3. *negative*, then the quadratic equation has *no* real solutions and its graph has *no*  $x$ -intercepts.

In Exercises 59–66, use the discriminant to determine the number of real solutions of the quadratic equation.

64.  $\frac{4}{7}x^2 - 8x + 28 = 0$

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In Exercises 67–90, use the Quadratic Formula to solve the equation.

74.  $6x = 4 - x^2$

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88.  $(z + 6)^2 = -2z$

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