


ERROR ANALYSIS Describe and correct the error in solving the equation.

49. $3x^2 + 6x + 15 = 0$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(3)(15)}}{2(3)}$$

$$= \frac{-6 \pm \sqrt{-144}}{6}$$

$$= \frac{-6 \pm 12}{6}$$


$$= 1 \text{ or } -3$$


50. $x^2 + 6x + 8 = 2$

$$x = \frac{-6 \pm \sqrt{6^2 - 4(1)(8)}}{2(1)}$$

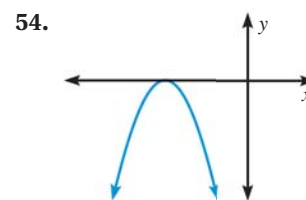
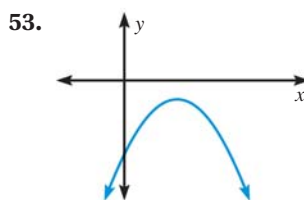
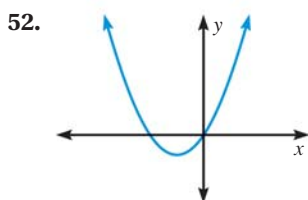
$$= \frac{-6 \pm \sqrt{4}}{2}$$

$$= \frac{-6 \pm 2}{2}$$

$$= -2 \text{ or } -4$$


51. **TAKS REASONING** For a quadratic equation $ax^2 + bx + c = 0$ with two real solutions, show that the mean of the solutions is $-\frac{b}{2a}$. How is this fact related to the symmetry of the graph of $y = ax^2 + bx + c$?

VISUAL THINKING In Exercises 52–54, the graph of a quadratic function $y = ax^2 + bx + c$ is shown. Tell whether the discriminant of $ax^2 + bx + c = 0$ is positive, negative, or zero.



55. **TAKS REASONING** What is the value of c if the discriminant of $2x^2 + 5x + c = 0$ is -23 ?

- (A) -23 (B) -6 (C) 6 (D) 14

THE CONSTANT TERM Use the discriminant to find all values of c for which the equation has (a) two real solutions, (b) one real solution, and (c) two imaginary solutions.

56. $x^2 - 4x + c = 0$ 57. $x^2 + 8x + c = 0$ 58. $-x^2 + 16x + c = 0$
 59. $3x^2 + 24x + c = 0$ 60. $-4x^2 - 10x + c = 0$ 61. $x^2 - x + c = 0$

62. **TAKS REASONING** Write a quadratic equation in standard form that has a discriminant of -10 .

WRITING EQUATIONS Write a quadratic equation in the form $ax^2 + bx + c = 0$ such that $c = 4$ and the equation has the given solutions.

63. -4 and 3 64. $-\frac{4}{3}$ and -1 65. $-1 + i$ and $-1 - i$

66. **REASONING** Show that there is no quadratic equation $ax^2 + bx + c = 0$ such that a , b , and c are real numbers and $3i$ and $-2i$ are solutions.
 67. **CHALLENGE** Derive the quadratic formula by completing the square to solve the general quadratic equation $ax^2 + bx + c = 0$.