GUIDED PRACTICE

Vocabulary Check ✓

1. Describe what it means to "complete the square" for an expression of the form $x^2 + bx$.

Concept Check ✓

2. Which method for solving quadratic equations—factoring or completing the square—is more general? Explain.

3. **ERROR ANALYSIS** A student tried to write $y = -x^2 - 6x + 4$ in vertex form as shown. Explain the student's mistake. Then write the correct vertex form of the function.

$y = -x^2 - 6x + 4$
$y = -(x^2 + 6x) + 4$
$y + 9 = -(x^2 + 6x + 9) + 4$
$y + 9 = -(x + 3)^2 + 4$
$y = -(x + 3)^2 - 5$

Skill Check ✓

Find the value of c that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

4. $x^2 + 2x + c$
5. $x^2 + 14x + c$
6. $x^2 - 6x + c$
7. $x^2 - 10x + c$
8. $x^2 + 5x + c$
9. $x^2 - 13x + c$

Solve the equation by completing the square.

10. $x^2 + 4x = -1$
11. $x^2 - 2x = 4$
12. $x^2 - 16x + 76 = 0$
13. $x^2 + 8x + 9 = 0$
14. $2x^2 + 12x = 4$
15. $3x^2 - 12x + 93 = 0$

Write the quadratic function in vertex form and identify the vertex.

16. $y = x^2 + 12x$
17. $y = x^2 - 4x + 7$
18. $y = x^2 - 8x + 31$
19. $y = x^2 + 10x + 17$
20. $y = -x^2 + 14x - 45$
21. $y = 2x^2 + 4x - 4$

22. **LANDSCAPE DESIGN** Suppose the homeowner in Example 5 has 60 feet of wire mesh to put around the garden and enough mulch to cover an area of 140 square feet. What should the dimensions of the garden be?

PRACTICE AND APPLICATIONS

STUDENT HELP

Extra Practice to help you master skills is on p. 946.

REWRITING EXPRESSIONS **Write the expression as the square of a binomial.**

23. $x^2 + 16x + 64$
24. $x^2 + 20x + 100$
25. $x^2 - 24x + 144$
26. $x^2 - 38x + 361$
27. $x^2 + x + 0.25$
28. $x^2 - 1.4x + 0.49$
29. $x^2 - 3x + \frac{9}{4}$
30. $x^2 + \frac{1}{6}x + \frac{1}{144}$
31. $x^2 - \frac{4}{9}x + \frac{4}{81}$

COMPLETING THE SQUARE **Find the value of c that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.**

32. $x^2 - 12x + c$
33. $x^2 + 18x + c$
34. $x^2 + 26x + c$
35. $x^2 - 44x + c$
36. $x^2 + 9x + c$
37. $x^2 - 11x + c$
38. $x^2 - 23x + c$
39. $x^2 + 15x + c$
40. $x^2 - 0.2x + c$
41. $x^2 - 5.8x + c$
42. $x^2 + 1.6x + c$
43. $x^2 + 9.4x + c$
44. $x^2 - \frac{2}{7}x + c$
45. $x^2 + \frac{10}{3}x + c$
46. $x^2 + \frac{17}{8}x + c$

STUDENT HELP

HOMEWORK HELP

Example 1: Exs. 23–46
Example 2: Exs. 47–54, 63–64
Example 3: Exs. 55–72
Example 4: Exs. 89–91
Example 5: Exs. 92, 93
Example 6: Exs. 73–84
Example 7: Exs. 94, 95

COEFFICIENT OF x^2 IS 1 **Solve the equation by completing the square.**

47. $x^2 + 2x = 9$

48. $x^2 - 12x = -28$

49. $x^2 + 20x + 104 = 0$

50. $x^2 + 3x - 1 = 0$

51. $u^2 - 4u = 2u + 35$

52. $v^2 - 17v + 200 = 13v - 43$

53. $m^2 + 1.8m - 1.5 = 0$

54. $n^2 - \frac{4}{3}n - \frac{14}{9} = 0$

COEFFICIENT OF x^2 IS NOT 1 **Solve the equation by completing the square.**

55. $2x^2 - 12x = -14$

56. $-3x^2 + 24x = 27$

57. $6x^2 + 84x + 300 = 0$

58. $4x^2 + 40x + 280 = 0$

59. $-4r^2 + 21r = r + 13$

60. $3s^2 - 26s + 2 = 5s^2 + 1$

61. $0.4t^2 + 0.7t = 0.3t - 0.2$

62. $\frac{w^2}{24} - \frac{w}{2} + \frac{13}{6} = 0$

SOLVING BY ANY METHOD **Solve the equation by factoring, by finding square roots, or by completing the square.**

63. $x^2 + 4x - 12 = 0$

64. $x^2 - 6x - 15 = 0$

65. $9x^2 - 23 = 0$

66. $2x^2 + 9x + 7 = 0$

67. $3x^2 + x = 2x - 6$

68. $4(x + 8)^2 = 144$

69. $7k^2 + 10k - 100 = 2k^2 + 55$

70. $14b^2 - 19b + 4 = -11b^2 + 11b - 5$

71. $0.01p^2 - 0.22p + 2.9 = 0$

72. $\frac{q^2}{4} - \frac{9q^2}{20} = 18$

WRITING IN VERTEX FORM **Write the quadratic function in vertex form and identify the vertex.**

73. $y = x^2 - 6x + 11$

74. $y = x^2 - 2x - 9$

75. $y = x^2 + 16x + 14$

76. $y = x^2 + 26x + 68$

77. $y = x^2 - 3x - 2$

78. $y = x^2 + 7x - 1$

79. $y = -x^2 + 20x - 80$

80. $y = -x^2 - 14x - 47$

81. $y = 3x^2 - 12x + 1$

82. $y = -2x^2 - 2x - 7$

83. $y = 1.4x^2 + 5.6x + 3$

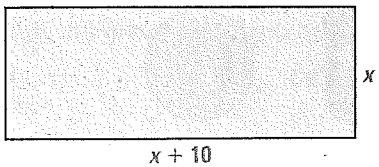
84. $y = \frac{2}{3}x^2 - \frac{4}{5}x$

STUDENT HELP

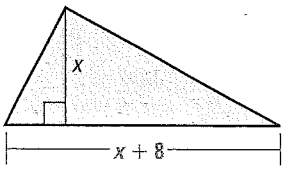
Skills Review
For help with areas of geometric figures, see p. 914.

GEOMETRY CONNECTION **Find the value of x.**

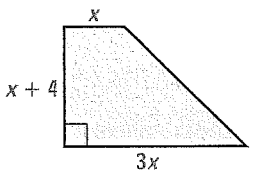
85. Area of rectangle = 100



86. Area of triangle = 40



87. Area of trapezoid = 70



88. Area of parallelogram = 54