Chapter 4

4.1 Graph the function. Label the vertex and axis of symmetry. 1–4. See margin.

1. $y = 3x^2 + 5$
2. $y = -x^2 - 4x - 4$
3. $y = -2x^2 + 4x + 1$
4. $y = 2x^2 + 5x + 6$

4.2 Graph the function. Label the vertex and axis of symmetry. 5–8. See margin.

5. $y = 4(x - 2)^2 + 1$
6. $y = -(x + 3)^2 - 2$
7. $y = 3(x - 1)(x - 5)$
8. $y = \frac{1}{2}(x + 3)(x + 2)$

4.2 Write the quadratic function in standard form.

9. $y = 7(x + 2)(x + 4)$ **$y = 7x^2 + 42x + 56$**
10. $y = 2(x + 5)(x - 3)$ **$y = 2x^2 + 4x - 30$**
11. $y = (x - 7)^2 + 7$
12. $y = -(x + 1)^2 - 4$ **$y = -x^2 - 2x - 5$**

4.3 Factor the expression. If the expression cannot be factored, say so.

13. $x^2 - 4x + 4$ **$(x - 2)^2$**
14. $t^2 - 11t - 26$
15. $x^2 + 21x + 108$ **$(x + 9)(x + 12)$**
16. $b^2 - 400$ **$(b - 20)(b + 20)$**

4.3 Solve the equation.

17. $x^2 + 5x - 14 = 0$ **$-7, 2$**
18. $x^2 - 11x + 24 = 0$ **$3, 8$**
19. $c^2 + 6c = 55$
20. $n^2 = 5n$ **$0, 5$**

4.4 Factor the expression. If the expression cannot be factored, say so.

21. $2r^2 + r - 15$
22. $10a^2 - 19a + 7$ **$(5a - 7)(2a - 1)$**
23. $3r^2 + 9r - 4$ **not factorable**
24. $4t^2 + 8t + 3$ **$(2t + 1)(2t + 3)$**

4.4 Find the zeros of the function by rewriting the function in intercept form.

25. $y = 81x^2 - 16$ **$-\frac{4}{9}, \frac{4}{9}$**
26. $y = 2x^2 - 9x - 5$ **$-\frac{1}{2}, 5$**
27. $y = 4x^2 + 18x + 18$
28. $y = -3x^2 - 30x - 27$ **$-9, -1$**

4.5 Simplify the expression.

29. $\sqrt{56}$ **$2\sqrt{14}$**
30. $3\sqrt{2} \cdot \sqrt{50}$ **30**
31. $\sqrt{\frac{4}{7}}$ $\frac{2\sqrt{7}}{7}$
32. $\frac{6}{1 + \sqrt{2}}$ **$-6 + 6\sqrt{2}$**

4.5 Solve the equation.

33. $b^2 = 8$ **$\pm 2\sqrt{2}$**
34. $p^2 + 6 = 127$
35. $(x - 5)^2 = 10$ **$5 \pm \sqrt{10}$**
36. $3(x + 2)^2 - 4 = 11$

4.6 Write the expression as a complex number in standard form.

37. $(5 + 2i) + (6 - 5i)$
38. $-3i(7 + i)$ **$3 - 21i$**
39. $\frac{1 + 2i}{3 - 8i}$ **$-\frac{13}{73} + \frac{14}{73}i$**
40. $\frac{(3 - 2i) + 2i}{(-1 + 7i) - (2 + 3i)}$ **$-\frac{9}{25} - \frac{12}{25}i$**

4.7 Solve the equation by completing the square.

41. $x^2 + 6x - 10 = 0$
42. $x^2 - 9x - 2 = 0$ **$\frac{9}{2} \pm \frac{\sqrt{89}}{2}$**
43. $2c^2 - 12c + 6 = 0$ **$3 \pm \sqrt{6}$**
44. $3z^2 - 3z + 9 = 0$ **$\frac{1}{2} \pm \frac{\sqrt{11}}{2}i$**

4.8 Use the quadratic formula to solve the equation.

45. $x^2 + 10x - 10 = 0$
46. $x^2 - x - 1 = 0$ **$\frac{1}{2} \pm \frac{\sqrt{5}}{2}$**
47. $4s^2 + 3s = 12$ **$-\frac{3}{8} \pm \frac{\sqrt{201}}{8}$**
48. $-2r^2 = r + 17$ **$-\frac{1}{4} \pm \frac{3\sqrt{15}}{4}i$**

4.9 Solve the inequality using any method.

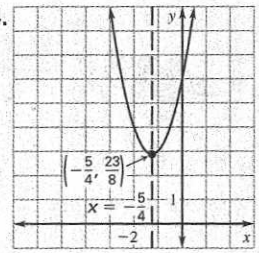
49. $x^2 - 10x \geq 0$ **$x \leq 0$ or $x \geq 10$**
50. $x^2 - 8x + 12 < 0$ **$2 < x < 6$**
51. $-x^2 + 7x + 6 > 1$ **$-0.653 < x < 7.65$**
52. $3x^2 + 16x + 2 \leq 3x$ **$-4.17 \leq x \leq -0.160$**

4.10 Write a quadratic function in standard form for the parabola that passes through the given points.

53. $(-1, -6), (0, -7), (2, 9)$ **$y = 3x^2 + 2x - 7$**
54. $(-2, -1), (1, 2), (3, -6)$ **$y = -x^2 + 3$**
55. $(-3, 36), (0, 36), (2, 16)$ **$y = -2x^2 - 6x + 36$**

EXTRA PRACTICE

4.



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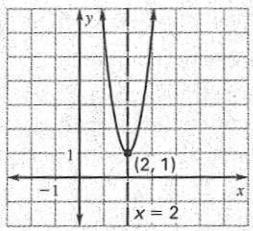

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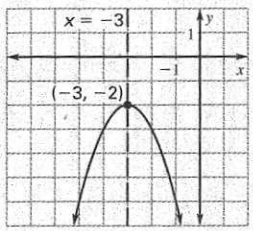

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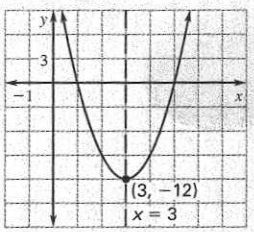

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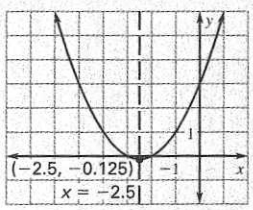

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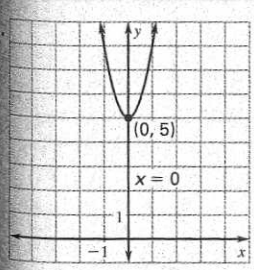

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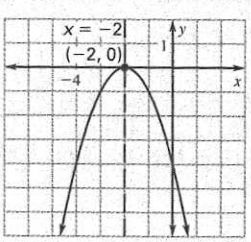
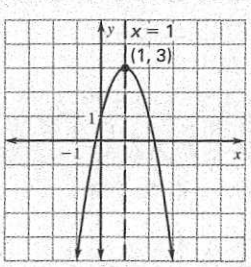
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