CHAPTER TEST

Graph the function. Label the vertex and axis of symmetry.

1. $y = x^2 - 8x - 20$

2. $y = -(x + 3)^2 + 5$

3. $f(x) = 2(x + 4)(x - 2)$

Factor the expression.

4. $x^2 - 11x + 30$

5. $z^2 + 2z - 15$

6. $n^2 - 64$

7. $2s^2 + 7s - 15$

8. $9x^2 + 30x + 25$

9. $6t^2 + 23t + 20$

Solve the equation.

10. $x^2 - 3x - 40 = 0$

11. $r^2 - 13r + 42 = 0$

12. $2w^2 + 13w - 7 = 0$

13. $10y^2 + 11y - 6 = 0$

14. $2(m - 7)^2 = 16$

15. $(x + 2)^2 - 12 = 36$

Write the expression as a complex number in standard form.

16. $(3 + 4i) - (2 - 5i)$

17. $(2 - 7i)(1 + 2i)$

18. $\dfrac{3 + i}{2 - 3i}$

Solve the equation by completing the square.

19. $x^2 + 4x - 14 = 0$

20. $x^2 - 10x - 7 = 0$

21. $4x^2 + 8x + 3 = 0$

Use the quadratic formula to solve the equation.

22. $3x^2 + 10x - 5 = 0$

23. $2x^2 - x + 6 = 0$

24. $5x^2 + 2x + 5 = 0$

Graph the inequality.

25. $y \geq x^2 - 8$

26. $y < x^2 + 4x - 21$

27. $y > -x^2 + 5x + 50$

Write a quadratic function whose graph has the given characteristics.

28. x-intercepts: −7, −3
    passes through: (−1, 12)

29. vertex: (−3, −2)
    passes through: (1, −10)

30. passes through:
    (4, 8), (7, −4), (8, 0)

31. **ASPECT RATIO** The *aspect ratio* of a widescreen TV is the ratio of the screen's width to its height, or 16 : 9. What are the width and the height of a 32 inch widescreen TV? (*Hint:* Use the Pythagorean theorem and the fact that TV sizes such as 32 inches refer to the length of the screen's diagonal.)
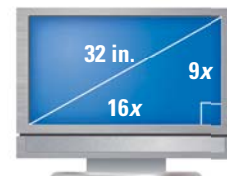
32. **WOOD STRENGTH** The data show how the strength of Douglas fir wood is related to the percent moisture in the wood. The strength value for wood with 2% moisture is defined to be 1. All other strength values are relative to this value. (For example, wood with 4% moisture is 97.9% as strong as wood with 2% moisture.) Use the quadratic regression feature of a graphing calculator to find the best-fitting quadratic model for the data.

Percent moisture, m	2	4	6	8	10
Strength, s	1	0.979	0.850	0.774	0.714
Percent moisture, m	12	14	16	18	20
Strength, s	0.643	0.589	0.535	0.494	0.458