Chapter Test

See CalcChat.com for tutorial help and worked-out solutions to odd-numbered exercises.

Take this test as you would take a test in class. When you are finished, check your work against the answers given in the back of the book.

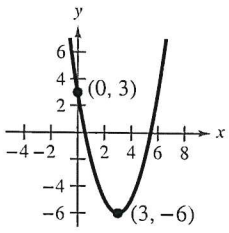

Figure for 2

1. Sketch the graph of each quadratic function and compare it with the graph of $y = x^2$.
   (a) $g(x) = 2 - x^2$
   (b) $g(x) = \left(x - \frac{3}{2}\right)^2$
2. Write the standard form of the equation of the parabola shown in the figure.
3. The path of a ball is given by the function $f(x) = -\frac{1}{20}x^2 + 3x + 5$, where $f(x)$ is the height (in feet) of the ball and x is the horizontal distance (in feet) from where the ball was thrown.
   (a) What is the maximum height of the ball?
   (b) Which number determines the height at which the ball was thrown? Does changing this value change the coordinates of the maximum height of the ball? Explain.
4. Describe the right-hand and left-hand behavior of the graph of the function $h(t) = -\frac{3}{4}t^5 + 2t^2$. Then sketch its graph.
5. Divide using long division.
   $$\frac{3x^3 + 4x - 1}{x^2 + 1}$$
6. Divide using synthetic division.
   $$\frac{2x^4 - 5x^2 - 3}{x - 2}$$
7. Use synthetic division to show that $x = \frac{5}{2}$ is a zero of the function
   $f(x) = 2x^3 - 5x^2 - 6x + 15.$
   Use the result to factor the polynomial function completely and list all the zeros of the function.
8. Perform each operation and write the result in standard form.
   (a) $10i - \left(3 + \sqrt{-25}\right)$
   (b) $\left(2 + \sqrt{3}i\right)\left(2 - \sqrt{3}i\right)$
9. Write the quotient in standard form: $\dfrac{5}{2 + i}$.

In Exercises 10 and 11, find a polynomial function with real coefficients that has the given zeros. (There are many correct answers.)

10. $0, 3, 2 + i$
11. $1 - \sqrt{3}i, 2, 2$

In Exercises 12 and 13, find all the zeros of the function.

12. $f(x) = 3x^3 + 14x^2 - 7x - 10$
13. $f(x) = x^4 - 9x^2 - 22x - 24$

In Exercises 14–16, identify any intercepts and asymptotes of the graph of the function. Then sketch a graph of the function.

14. $h(x) = \dfrac{4}{x^2} - 1$
15. $f(x) = \dfrac{2x^2 - 5x - 12}{x^2 - 16}$
16. $g(x) = \dfrac{x^2 + 2}{x - 1}$

In Exercises 17 and 18, solve the inequality. Then graph the solution set.

17. $2x^2 + 5x > 12$
18. $\dfrac{2}{x} \leq \dfrac{1}{x + 6}$