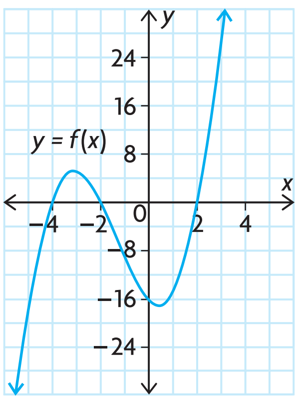
3 Chapter Self-Test



1. a) Write the standard form of a general polynomial function. Then state the degree and leading coefficient of this function.
   b) What is the greatest number of turning points that this function can have?
   c) What is the greatest number of zeros that this function can have?
   d) If the least number of zeros is one, describe the degree of this function.
   e) A polynomial function is less than zero for all x. Describe the degree and the leading coefficient of this function.

2. Determine the equation of the polynomial function $y = f(x)$ shown. Express your answer in factored form.

3. Factor each expression.
   a) $2x^3 - x^2 - 145x - 72$ b) $(x - 7)^3 + (2x + 3)^3$

4. LaDainian graphed the cubic function $g(x) = x^3 - 4x^2$, and then vertically translated the graph 1 unit up. Does the resulting graph have fewer zeros, the same number of zeros, or more zeros than the original graph?

5. During which intervals of x is the graph of the function $f(x) = -(x + 3)(x + 5)(x - 1)$ below the x-axis?

6. Divide $6x^3 + x^2 - 12x + 5$ by $2x - 1$. Is the divisor a factor of the dividend?

7. The function $y = x^3$ has been vertically stretched by a factor of 5, horizontally compressed by a factor of $\frac{1}{2}$, horizontally translated 2 units to the right, and vertically translated 4 units up.
   a) Write the equation of the transformed function.
   b) The point (1, 1) is on the parent function. Determine the new coordinates of this point on the transformed function.

8. Julie divided $x^4 + 3x^3 - 9x^2 + 6$ by a polynomial. Her answer was $x^3 - 2x^2 + x - 5$, with a remainder of 31. What polynomial did Julie divide by?

9. The function $f(x) = ax^4 + 8x^2$ has three turning points, an absolute maximum of 8, and one of its zeros at $x = 2$. Determine the value of a and the location of the other zeros. Then sketch the graph of $f(x)$.