**Name** _____

## 11-6B  Lesson Master

### VOCABULARY

1. Suppose $r$ is a *root* of a polynomial function with *multiplicity* 3. What does this tell you?

   _____

   _____

2. Give an example of a polynomial function in factored form that has

   a. 5 as a double root. _____

   b. 3 as a root with multiplicity 4. _____

### SKILLS  Objective C

**In 3–8, a polynomial is written factored over the rational numbers. a. Give the degree of the polynomial, and b. find all zeros and their multiplicities.**

3. $x^3(x-5)(2x-5)$    a. _____    b. _____

4. $(x+1)^3(x+20)$    a. _____    b. _____

5. $(x+2)^3(5x+7)(x-1)$   a. _____    b. _____

6. $(4x+9)(x+2)(x-1)$    a. _____    b. _____

7. $x^2(4x-5)(x-5)$    a. _____    b. _____

8. $(x+1)(x+2)^{20}$    a. _____    b. _____

**In 9–12, use a CAS to factor the polynomial a. over the real numbers, and b. over the complex numbers. c. List all zeros and their multiplicities.**

9. $x^3 - 2x^2 - 21x - 18$

   a. _____

   b. _____

   c. _____

10. $3x^2 + 2x + 8$

   a. _____

   b. _____

   c. _____

11. $x^4 + 6x^3 + 2x^2 - 42x - 63$

   a. _____

   b. _____

   c. _____

12. $x^5 - 2x^4 - 3x^3 + 6x^2 - 4x + 8$

   a. _____

   b. _____
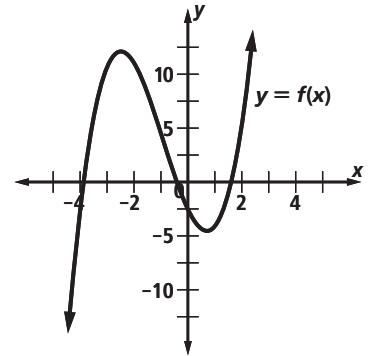
   c. _____

**Name** _____

**11-6B**                                                                **page 2**

**( PROPERTIES )**   Objective F

**13.** How many complex roots does the equation $2x^5 - x + \pi i = 0$ have?        _____

**14.** $P$ is a quartic polynomial whose only roots are 5, 2 and –1.
Write a possible equation for $P$ in factored form.        _____

**15.** The cubic function $f(x)$ is graphed at the right.
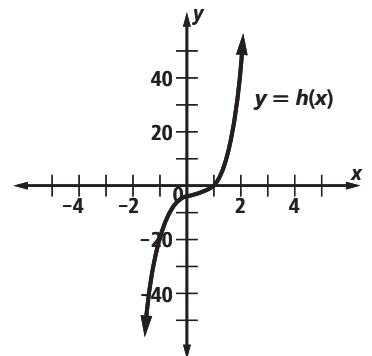The graph shows all intercepts.

   **a.** How many complex zeros does $f$ have? _____

   **b.** How many of the zeros are real numbers? _____

   **c.** How many of the zeros are nonreal numbers? _____

**16.** The function $h(x) = x^5 - x^4 + 5x^3 - 5x^2 + 4x - 4$ is graphed at the
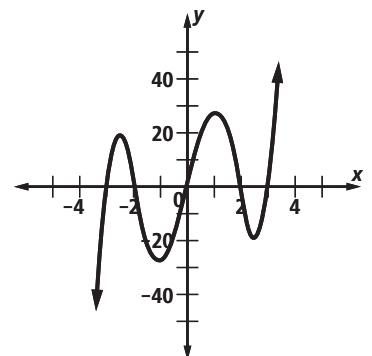right. The graph shows all intercepts.

   **a.** How many complex zeros does $h$ have? _____

   **b.** How many of the zeros are real numbers? _____

   **c.** How many of the zeros are nonreal numbers? _____

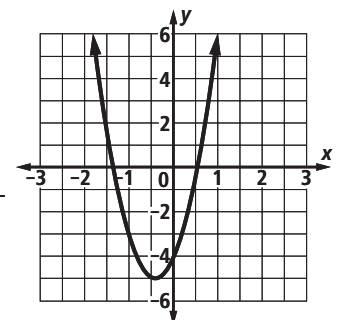**17.** The function $f(x) = x^5 - 13x^3 + 36x + k$ is graphed at the right
for $k = 0$.

   **a.** How many of the zeros of $f$ are real numbers? _____

   **b.** Find a value of $k$ so that $f$ has one real zero. _____

   **c.** Explain why there is no real value of $k$ where $f$ has no real zeros.

   _____

   _____

**18.** The function $f(x) = 6x^2 + 5x + k$ is graphed at the right for
$k = -4$.

   **a.** How many of the zeros of $f$ are real numbers? _____

   **b.** Find a value of $k$ so that $f$ has no real zeros. _____

   **c.** Find a value of $k$ for which $f$ has exactly one real zero. _____

*Advanced Algebra*     **561**