Names: _____ _____ _____

College Algebra Activity #3: Polynomials 1

1. Fill in the boxes to describe the long-term behavior of the following polynomial.

$$p(x) = 7x^6 + 13x^2 - x + 1$$

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- As $x \to \infty$, $p(x) \to$ ☐
- As $x \to -\infty$, $p(x) \to$ ☐

2. Using polynomial long division, find the quotient and remainder when

$$a(x) = x^5 - 4x^4 + 14x^2 - 17x + 6$$

is divided by

$$b(x) = x^3 - 2x^2 - 5x + 6.$$

3. Use synthetic division to find the quotient and remainder when

$$a(x) = x^5 - x^4 - 5x^3 + 5x^2 + 4x - 4$$

is divided by $b(x) = x - 1$.

4. The polynomial
$$p(x) = x^5 - 4x^4 - 10x^3 + 40x^2 + 9x - 36$$
has roots at $1; -3; 3; -1$. Completely factor $p(x)$ as a product of linear factors.

5. The polynomial
$$p(x) = x^5 - 6x^4 + 14x^3 - 16x^2 + 9x - 2$$
has roots at 1 and 2. Find the multiplicity of these roots.

6. Construct a polynomial of degree 3 which has roots at -2, 1, and -1.