

Names: \_\_\_\_\_

**College Algebra Activity #3: Polynomials 1**

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

$$p(x) = 3x^3 - 2x + 1$$

• As  $x \rightarrow \infty$ ,  $p(x) \rightarrow$

• As  $x \rightarrow -\infty$ ,  $p(x) \rightarrow$

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

$$a(x) = x^5 - 2x^4 - 2x^3 + 8x^2 - 7x + 2$$

is divided by

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

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  $b(x) = x + 2$ .

4. The polynomial

$$p(x) = x^5 - 4x^4 - 10x^3 + 40x^2 + 9x - 36$$

has roots at 4; 1; -3; 3. Completely factor  $p(x)$  as a product of linear factors.

5. The polynomial

$$p(x) = x^5 - 7x^4 + 19x^3 - 25x^2 + 16x - 4$$

has roots at 1 and 2. Find the multiplicity of these roots.

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