

Name: _____

College Algebra: Review (Test 3)

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. Construct a polynomial having roots at -1 , 2 , and $-1/2$.

3. The polynomial

$$p(x) = x^5 - x^4 - 13x^3 + 13x^2 + 36x - 36$$

has roots at $-2; 1; 3; 2$. Completely factor $p(x)$ as a product of linear factors.

4. Find the list of candidate roots of the polynomial

$$p(x) = 2x^3 - x^2 + 6x + 6$$

given by the Rational Root Theorem. **Do not factor.**

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

$$a(x) = x^5 - 3x^4 - x^3 + 11x^2 - 12x + 4$$

is divided by

$$b(x) = x^3 - x^2 - 4x + 4.$$

6. The polynomial

$$p(x) = x^4 - 4x^2 + 3$$

has a root at $\sqrt{3}$. Completely factor $p(x)$ as a product of linear factors.

7. The polynomial

$$p(x) = x^4 + 2x^3 + 5x^2 + 8x + 4$$

has a root at $2i$. Completely factor $p(x)$ as a product of linear factors.

8. Find the multiplicity of -1 as a root of the following polynomial.

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