College Algebra

Test 3

Form A

Spring 2016

Name: _____

Date: _____

READ THESE INSTRUCTIONS CAREFULLY!

- Circle or underline your final written answer.

- Justify your reasoning and show your work.

- If you run out of space, make a note and continue your work on the back of a page.

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

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

.

- As $x \to \infty$, $p(x) \to$ ☐

- As $x \to -\infty$, $p(x) \to$ ☐

2. Construct a polynomial having roots at 1, -3, and $1/3$.

3. The polynomial
$$p(x) = x^5 - 5x^4 - 3x^3 + 29x^2 + 2x - 24$$
has roots at $-2; -1; 1; 3$. Completely factor $p(x)$ as a product of linear factors.

4. Find the list of candidate roots of the polynomial

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

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

$$p(x) = x^4 - 6x^2 + 5$$

has a root at $\sqrt{5}$. Completely factor $p(x)$ as a product of linear factors.

7. Find the multiplicity of 1 as a root of the following polynomial.

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

8. The polynomial

$$p(x) = x^5 - 8x^4 + 25x^3 - 38x^2 + 28x - 8$$

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