College Algebra

Test 3

Form A

Spring 2016

Name: _____

Date: _____

<u>READ THESE INSTRUCTIONS CAREFULLY!</u>

- 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.

$$p(x) = -4x^5 + 10x^2 + x - 1$$

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- As $x \to \infty$, $p(x) \to \boxed{}$

- As $x \to -\infty$, $p(x) \to \boxed{}$

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

3. The polynomial
$$p(x) = x^5 - 3x^4 - 5x^3 + 15x^2 + 4x - 12$$
has roots at $2; -2; -1; 3$. Completely factor $p(x)$ as a product of linear factors.

4. Find the list of candidate roots of the polynomial

$$p(x) = 3x^3 + 4x^2 + 4x + 6$$

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

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

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

is divided by

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

6. Find the long-term behavior asymptote of the following rational function.

$$f(x) = \frac{x^3 - 2x^2 + 3x - 5}{x^2 + x + 1}$$

7. Find the domain of the following rational function.

$$f(x) = \frac{1337x^{42} - x^{27} + 1}{(x-1)^2(x+2)(x-3)^3}$$

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

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

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