

# 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. Find all solutions of the following equation.

$$x^3 + 6x^2 - 27x = 0$$

2. Find all solutions of the following equation.

$$2x^4 - 9x^2 + 9 = 0$$

3. 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  $x \rightarrow \infty$ ,  $p(x) \rightarrow$  , and as  $x \rightarrow -\infty$ ,  $p(x) \rightarrow$

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

$$a(x) = x^5 - x^4 - 9x^3 + 5x^2 + 16x - 12$$

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

5. Find the list of candidate roots of the polynomial

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

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

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

7. The polynomial

$$p(x) = x^5 - 7x^4 + 5x^3 + 55x^2 - 126x + 72$$

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

8. The polynomial

$$p(x) = x^7 - 9x^6 + 34x^5 - 70x^4 + 85x^3 - 61x^2 + 24x - 4$$

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

Bonus. The polynomial

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

has a root at  $\sqrt{2}$ . Completely factor  $p(x)$  as a product of linear factors.