Name: _____

College Algebra: Review (Test 3)

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 $x \to \infty$, $p(x) \to$ $\square$
- As $x \to -\infty$, $p(x) \to$ $\square$

2. The polynomial

$$p(x) = x^5 + 2x^4 - 10x^3 - 20x^2 + 9x + 18$$

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

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

4. The polynomial

$$p(x) = x^4 - 7x^2 + 12$$

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

5. Complete the square to find the standard form of the folloing parabola.

$$y = x^2 + 8x + 13$$

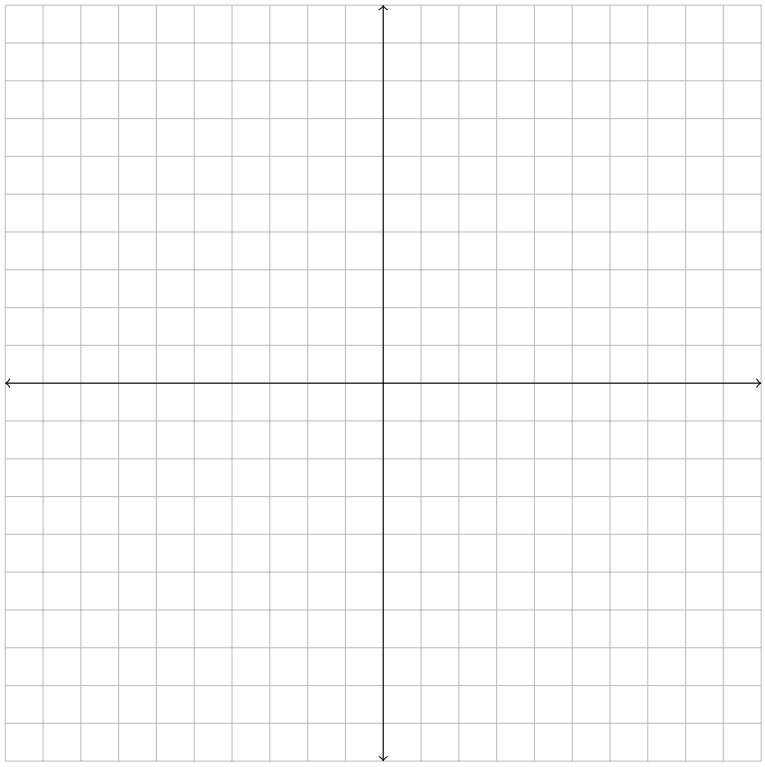
6. Find an equation for the parabola with horizontal directrix having vertex $(5, -5)$ and focal length -3.

7. Find the domain of the following rational function.

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

8. Plot the following ellipse in the space provided.

$$\left(\frac{x-5}{4}\right)^2 + \left(\frac{y-6}{2}\right)^2 = 1$$



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

$$f(x) = \frac{x^3 - 3x^2 - 4x + 12}{x + 6}$$

10. Plot the following parabola in the space provided.

$$y = \frac{1}{-4}(x - 5)^2 + 3$$