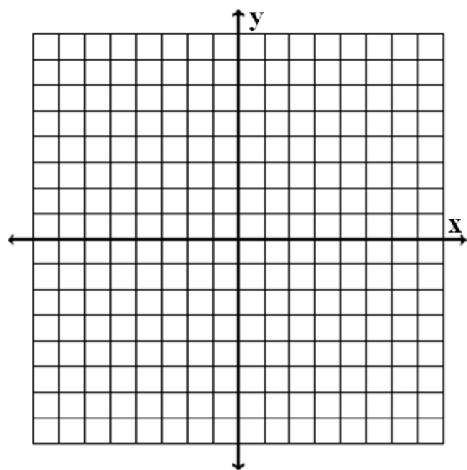**Pre-Calculus Test   Chapter 2**   **Form A**   **Show ALL work!!!**

1 Perform the operation and write the result in standard form.

$$\left(\sqrt{14} + \sqrt{10}i\right)\left(\sqrt{14} - \sqrt{10}i\right)$$

2 **Chapter 1** Graph the piecewise function.

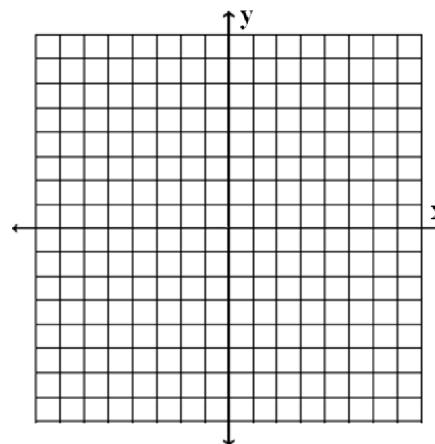$$f(x) = \begin{cases} 2x + 3, & x < 0 \\ -\dfrac{1}{2}x + 5, & x \geq 0 \end{cases}$$

3 Find all the zeros of the function, determine the multiplicty of each zero, and make a rough sketch of the graph.

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

Zeros:

Multiplicity:

4 **Chapter 0** Solve the equation and check your solutions.

$$(x - 5)^{\frac{3}{2}} = 8$$

5   Write the complex number in standard form.

$4 + \sqrt{-9}$

7   Use long division to divide.

$(x^4 + 3x^2 + 1) \div (x^2 - 2x + 3)$

6   State the <u>possible</u> rational zeros of the function. You don't need to find the zeros.

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

8   Find a polynomial function with real coefficients that has the given zeros. (There are many correct answers.)
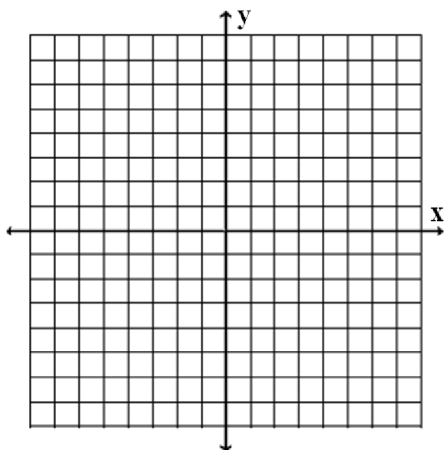
$1, 5i, -5i$

2

9 The axis of symmetry formula can be used to find the _____ of a parabola?

10 Graph the function. Use the given information to assist you.

$$h(x) = \frac{x^2 - 5x + 4}{x^2 - 4}$$

$h(-3) = 5.6$, $h(3) = -.4$

$h(-1) = -3.3$, $h(0) = -1$, $h(1.9) = 4.85$

11 Find the domain of the function and identify any vertical and horizontal asymptotes.

$$f(x) = \frac{x - 4}{x^2 - 16}$$
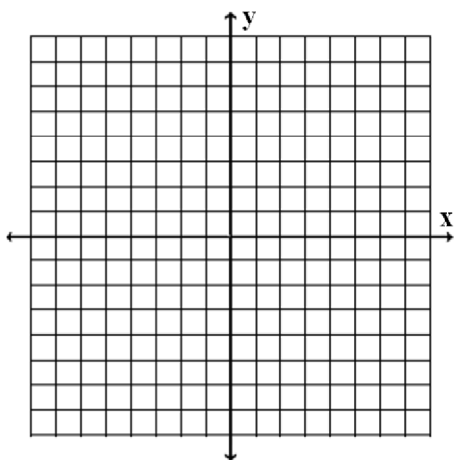
Domain:

Vertical Asymptote(s):

Horizontal Asymptote(s):

12 Solve the inequality and state the solution using interval notation.

$$\frac{x + 6}{x + 1} - 2 < 0$$

3

13 Graph.

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

14 **Path of a Diver** The path of a diver is given by

$$y = -2x^2 + 12x - 6$$

where y is the height (in feet) and x is the horizontal distance from the end of the diving board (in feet). What is the maximum height of the diver?

15 Solve the inequality and state the solution using <u>interval</u> notation.

$$x^3 - 2x^2 - 9x - 2 \geq -20$$

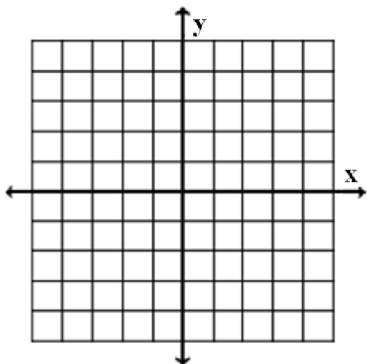16 Use the information given to state the complete factorization of the polynomial and its solutions (zeros).

Polynomial Equation	Value of x
$x^3 - 7x + 6 = 0$	$x = 2$

Factorization:

Solutions:

17 Sketch the graph of the function.
$$f(x) = (x+3)^2 - 2$$

18 Use synthetic division to divide.
$$(3x^3 - 17x^2 + 15x - 25) \div (x - 5)$$

19 Write the quotient in standard form.
$$\frac{2}{4 - 5i}$$

20 Re-write the function in standard form. State the vertex, axis of symmetry, and x-intercepts for the quadratic function.

$$h(x) = 4x^2 - 4x + 21$$

Standard Form:

Vertex:

Axis of Symmetry:

x-intercept(s):