

Name:

Directions: Complete all questions and **show all applicable work.** Partial credit will be given. All questions are equally weighted (10pts each).

1.) Find the inverse of the following function. Also state the domain and range of the inverse:

$$f(x) = 4\sqrt{2x + 3}$$

2.) Simplify:

$$(7i - 3)(2i - 5)$$

3.) Simplify:

$$\frac{2i + 3}{i - 5}$$

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4.) Put the following quadratic function in standard form ($y = a(x - h)^2 + k$), then graph it clearly stating how you found the vertex, concavity (ie. open up or down), y-intercept and x-intercepts.

$$y = x^2 - 2x - 3$$

5.) Solve the following equation for x :

$$x^2 - 2x = -2$$

6.) Find all the roots (aka zeros) of the following function and tell the multiplicity of each:

$$f(x) = 4(x - 1)^2(x + 2)(x - 6)$$

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7.) Find the vertex, y-intercept and x-intercept(s) of the following function, then graph it.

$$y = (x - 3)^2 - 4$$

8.) Divide the polynomial $x^4 - 3x^3 + 2x^2 + 4x + 5$ by the term $x - 2$. Do it once with long division, then again with synthetic division. Are your answers the same? Should they be?

9.) Describe the tail behavior (for very large positive and very large negative x-values) of the following polynomial.

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

10.) Graph the following function, *show* how you arrived at your solution, including intercepts and tail behavior:

$$f(x) = 7x^2(x - 6)(x + 6)$$