**Take Home LCQ** - **Polynomial Skills**

Name: _____

Period: _____ver JJJ

Notes ok (but try not to use them !)

1. Write a polynomial function, in factored form, which has single roots at x= 1, 3, and -1 and it passes through the point (4, 30). Appropriate steps must be shown for full credit. *[4 marks]*

2. For the graph shown <u>list</u> all real roots and their nature (single, double, etc). Also List the number of complex roots, if any. *[3 marks]*
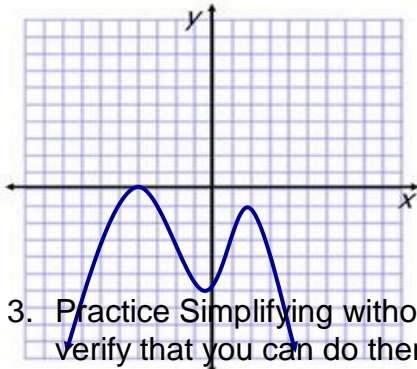
<u>Write # of real Root(s)</u> and the number of associated factors in the function

<u>Write # of Non-real Root(s)</u> and the number of associated factors in the function

3. Practice Simplifying without a calculator, the 4 following expressions. Show your work to verify that you can do them without a calculator. (yes, they can be done with a calculator). *[4 marks]*

$8 - \sqrt{-36}$ $(2i)^2(4i)$ $(x - 3i)(x + 3i)$ i^{17}

4. Create a quadratic polynomial, in the form $f(x) = x^2 + bx + c$ given its two roots: Show your technique. You should practice both the long and shortcut methods.

   8+5i and 8-5i

5. Find the exact roots of $f(x) = x^2 - 2x + 2$
   Show work. Simplify roots to $a \pm bi$ form and leave answers exact.

6. Practice sketching and labeling a graph of a possible polynomial function in factored form, without a calculator. Additional requirement: Your graph should not work (be mistaken) for a lower degree function. (lower than degree 5 in this case)

   $f(x) = 2x(x - 43)(x + 70)(x + 25)^2$