MODULE 5

ROOTS AND GRAPHS OF POLYNOMIALS

Name:_____ Points:_____

Exercise 1. Multiply and write your answer as a polynomial in descending degree (that is in the form $ax^2 + bx + c$).

(a) Multiply $(x - (3 + 2i)) \cdot (x - (3 - 2i)) =$

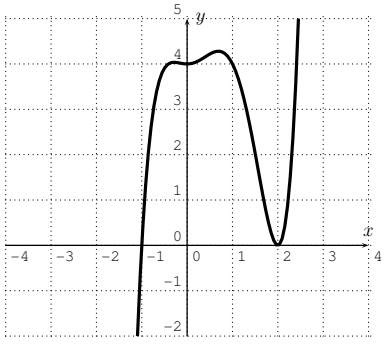
(b) Multiply $(x - 5) \cdot (x - (4 + 6i)) =$

Note: The above examples confirm again that a polynomial has real coefficients exactly when for each complex root $c = a + bi$ its complex conjugate $\bar{c} = a - bi$ is also a root.

Exercise 2.

(a) Find a polynomial of degree 4 whose roots include 2, -3, and so that $f(0) = 10$.

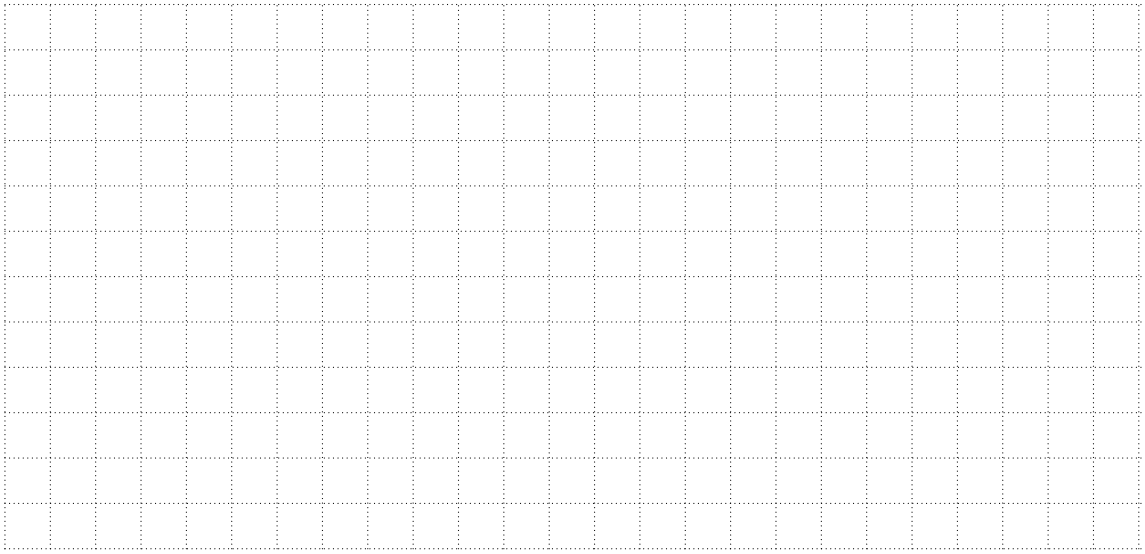
(b) The following graph is the graph of a polynomial of degree 5 which displays all of the roots of the polynomial. What is a possible formula for the polynomial?



Exercise 3. Let $f(x) = x^3 - x^2 - 10x + 12$.

(a) Find all roots of the polynomial **without** approximation. Write your answer in simplest radical form.

(b) Sketch a complete graph of the function f. Include all roots, all maxima, and all minima.



Exercise 4. Factor **completely**.

(a) $y = x^4 + 2x^3 - 3x^2 - 8x - 4$

(b) $y = x^6 + 2x^5 + x^4 + 2x^3$