Exploration in Polynomials graphing

Given the polynomial:

$$P(x) = x^8 - 10x^7 + 47x^6 - 120x^5 + 135x^4 - 10x^3 - 67x^2 + 100x - 156$$

1. How many terms are there in P(x)?
2. What is the degree of the polynomial?
3. What is the sign of the leading coefficient?

You can already determine the end-behavior of the graph.

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Given that the polynomial has roots at $x = 3$, at $x = (2 + 3i)$, at $(x = 2)$ it has a root with multiplicity 2, and a root at $x = i$, find all the remaining roots, and factor P(x) to it's linear or quadratic components.

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Use the space below (and back) for computations, and summarize your results on the next page.

Write all 8 roots of the polynomial:

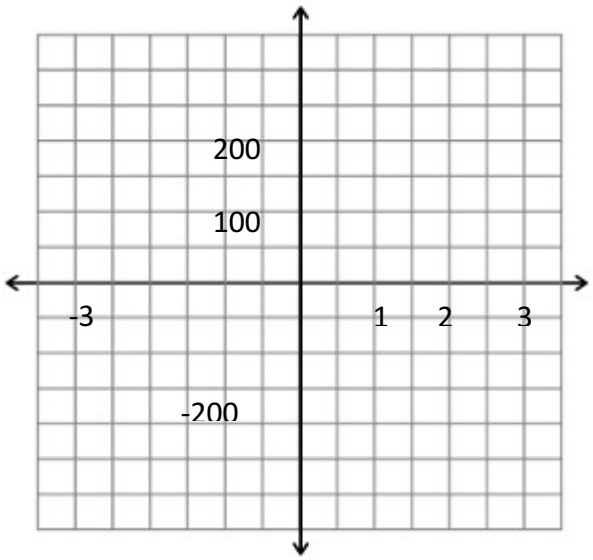
1. _____ 2. _____

3. _____ 4. _____

5. _____ 6. _____

7. _____ 8. _____

Plot the polynomial based on the above results, and compare your result with graphic calculator.



Remainder theorem

1. A. Given the polynomial

$$P(x) = 3x^5 + 2x^4 - 4x^2 + 5x + 2$$

Write it in the form

$$P(x) = (x - 1) \cdot (\_\_\_\_\_) + \_\_\_\_\_$$

B. Can you find the remainder WITHOUT performing a division, but rather directly from $P(x)$?

1. Given the polynomial

$$P(x) = x^6 - 2x^5 - 4x^3 + 5x^2 + 6x + 3$$

Write it in the form

$$P(x) = (x - 2) \cdot (\_\_\_\_\_) + \_\_\_\_\_$$

2. Can you find the remainder WITHOUT performing a division, but rather directly from $P(x)$?