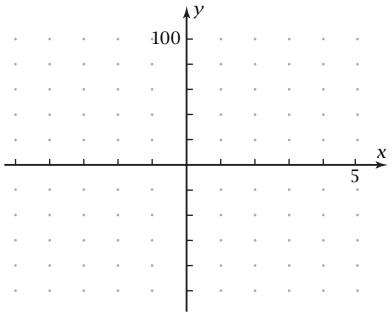
Name: _____ Group Members: _____

Exploration 15-2a: Synthetic Substitution

Date: _____

Objective: Learn how to evaluate $f(x)$ quickly by pencil and paper and how to use the result to factor $f(x)$.

1. Let $f(x) = 3x^3 + 4x^2 + 11x - 10$. Plot the graph using a window with an x-range of about $[-5, 5]$ and a y-range of $[-100, 100]$. Sketch the graph here.



2. Find $f(2)$. Mark the corresponding point on your graph.

3. Use long division to divide $f(x)$ by $x - 2$. See Section 15-2 if you do not recall how to do this. What is the quotient? What is the remainder?

4. What do you notice about the remainder and the value of $f(2)$?

5. Find $f(2)$ by synthetic substitution. If you don't recall how to do this, look in Section 15-2.

6. How could you write the answer to Problem 3 directly from the synthetic substitution results?

7. Find $f\left(\frac{2}{3}\right)$ by synthetic substitution. How does the result agree with your graph?

8. Use the result of Problem 7 to find the other two zeros of $f(x)$. Write the complex zeros in terms of i and simplify as much as possible.

9. What did you learn as a result of doing this Exploration that you did not know before?

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