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# NOTES: Section 5.7 – Apply the Fundamental Theorem of Algebra

Goals: #1 - I can identify the number of solutions or zeros in a polynomial.

#2 - I can find all the zeros (real, imaginary, and repeated) in a polynomial.

#3 - I can write a polynomial with given zeros.

#4 - I can determine the number and type of zeros of a polynomial given the degree and graph.

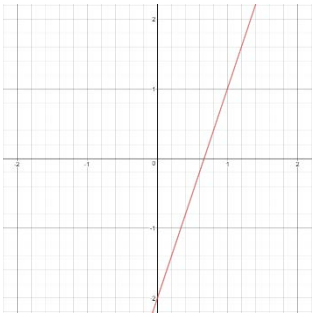


*Homework: Lesson 5.7 Worksheet*

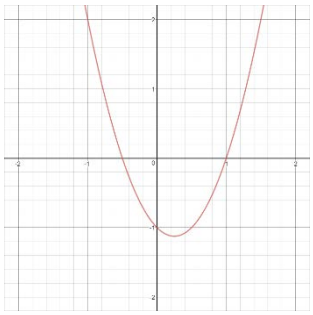
**Exploration #1:** Work with a partner and answer the following questions.

1. How many zeros are in the following graph?

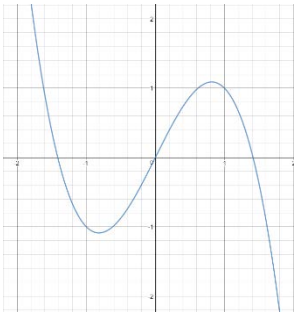
$f(x) = 3x - 2$



$f(x) = 2x^2 - x - 1$



$f(x) = -x^3 + 2x$



**Notes:**

- _____:

  If a _____ $f(x)$ has a _____, then the equation $f(x) = 0$ has exactly _____, given each _____ counts as _____.

**Example #1:** Find the number of solutions or zeros of the following polynomial.

1. $x^3 + 5x^2 + 4x + 20 = 0$
2. $f(x) = x^4 - 8x^3 + 18x^2 - 27$

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**Example #2:** Find all zeros of the polynomial function.

1. $f(x) = x^5 - 4x^4 + 4x^3 + 10x^2 - 13x - 14$

**You practice:** Find all zeros of the polynomial function.

1. $f(x) = x^5 - 2x^4 + 8x^2 - 13x + 6$

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**Notes:**

- _____:
  - If a _____ $f(x)$ has _____ as an imaginary zero, then _____ is also a _____ of $f$.
  - If a _____ $f(x)$ has _____ as an imaginary zero, then _____ is also a _____ of $f$.

**Example #3:** Write a polynomial function $f$ of least degree that has rational coefficients, a leading coefficient of 1, and 3 and $2+\sqrt{5}$ as zeros.

**You practice:** Write a polynomial function $f$ of least degree that has rational coefficients, a leading coefficient of 1, and 2, $2i$, and $4-\sqrt{6}$ as zeros.