(A) Lesson Context

BIG PICTURE of this UNIT:	• What is a Polynomial and how do they look? • What are the attributes of a Polynomial? • How do I work with Polynomials?		
CONTEXT of this LESSON:	Where we've been We have discussed the basic appearance of graphs of polynomial functions	Where we are How can we determine the zeroes of a polynomial function when the equation is in standard form?	Where we are heading What are the key attributes of a polynomial and how do these affect the shape?

(B) Lesson Objectives:

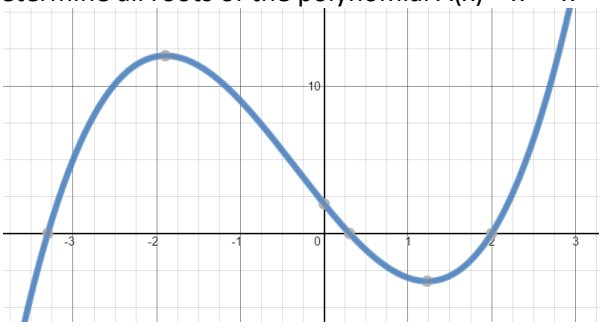
a. Understand the connection between roots, zeroes and factors.
b. Work with the method of synthetic division in order to determine roots and zeroes of polynomials.
c. Factor and sketch polynomial functions when equations are presented in standard form.

(C) Examples

1. Which binomials are factors of $P(x) = 2x^3 - x^2 - 7x + 6$? (a) $x + 3$ (b) $2x - 3$
2. Which binomials are factors of $P(x) = -2x^4 - 7x^3 + 22x^2 + 63x - 36$? (a) $x - 1$ (b) $x - 3$

3. Given the polynomial $P(x) = x^3 - 2x^2 - 21x - 18$, is $x = 6$ a zero of $P(x)$? is $x = -2$ a zero of $P(x)$?
4. Given the polynomial $P(x) = x^4 - 3x^3 + 3x^2 - 3x + 2$, is $x = 2$ a root of $P(x)$? is $x = -2$ a root of $P(x)$?

5. Given the polynomial $g(x) = 2x^3 + x^2 - 27x - 35$, one factor of $x + 3$ is given. Determine the other factors.
6. Factor $P(x) = x^4 - 6x^3 + 22x^2 - 30x + 13$ given that $x = 1$ is a double root.
7. Given the polynomial $h(x) = x^4 + 3x^3 - x - 3$, one of the roots is $x = -3$. Determine the other roots.
8. Determine all roots of the polynomial $A(x) = x^3 + x^2 - 7x + 2$, given the following graph of A(x)



9. Factor using the Factor Theorem: $f(x) = x^3 - 3x^2 - 10x + 24$
10. Factor using the Factor Theorem: $f(x) = x^4 + 2x^3 - 23x^2 - 24x + 144$

11. Sketch the function $g(x) = 6 + 5x - 2x^2 - x^3$
12. Sketch the function $f(x) = 3x^3 + x^2 - 22x - 24$ & label all intercepts.
13. Sketch the function $f(x) = x^4 + x^3 - 7x^2 - x + 6$ & label all intercepts.