Integrated Math 3
Unit 6: Polynomials
6.10

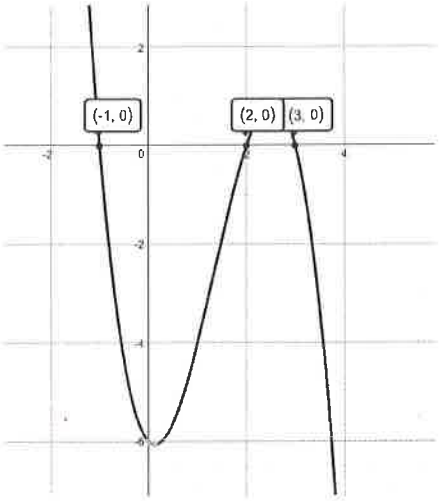
Name: _____

Date: _____ Period: _____

Objective: Graph simple polynomial equations by finding zeros and end behavior.

Warm Up:

On the right is a graph of a polynomial. Identify the following:



- Degree of the polynomial: 3
- Sign of the leading coefficient: −
- X-intercepts/Zeros: (−1,0), (2,0), (3,0)

Extending Ideas:

- Above you listed all x-intercepts of the polynomial. How could we write those x-intercepts as factors?

$(x+1)(x-2)(x-3)$

- How could we translate those factors into factored form?

$f(x) = -(x+1)(x-2)(x-3)$

- Once the equation is in factored form, we are able to write it in standard form by multiplying the factors together!

$-(x+1) = -x-1$

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

	x	-2
$-x$	$-x^2$	$2x$
-1	$-x$	2

⇒

	$-x^2$	x	2
x	$-x^3$	x^2	$2x$
-3	$3x^2$	$-3x$	-6

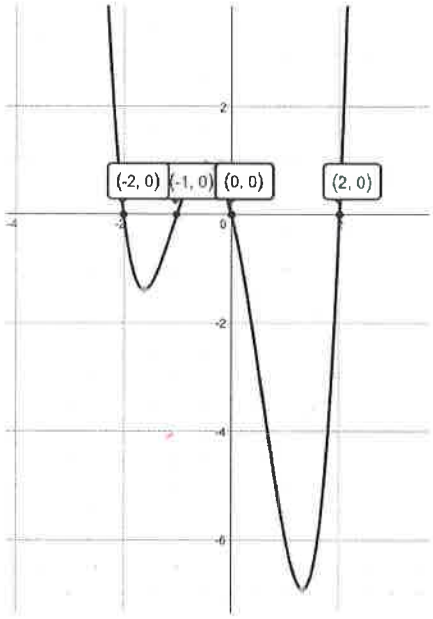
$-(x+1)(x-2)$

$= -x^2+x+2$

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

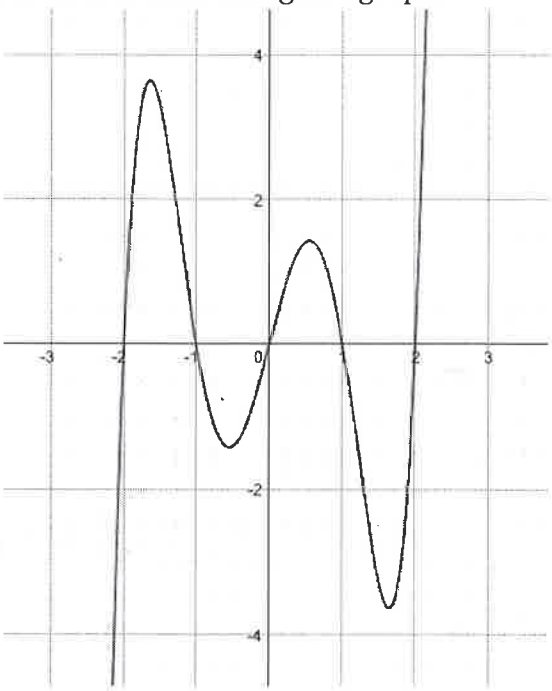
Example 1: Write a possible equation of a polynomial in factored form from looking at a graph.

A.)



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

B.)



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

or

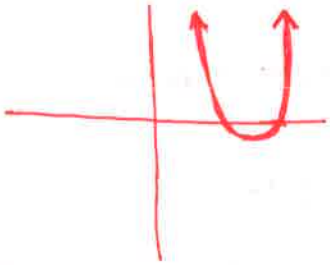
$f(x) = x(x^2-4)(x^2-1)$

Example 2: Write a possible equation of a polynomial in factored form from written information.

A.) Write an equation of a quadratic polynomial with a positive leading coefficient that has x-intercepts at $x = 4, 6$. Sketch an image of this polynomial.

(4,0), (6,0)

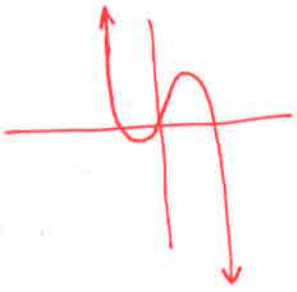
$f(x) = (x-4)(x-6)$



B.) Write an equation of a cubic polynomial with a negative leading coefficient that has x-intercepts at $x = 0, 3, -1$. Sketch an image of this polynomial.

(0,0), (3,0), (-1,0)

$f(x) = -x(x-3)(x+1)$



Example 3: Given $h(x) = x(2x + 5)(x - 4)^2$

a. Factor h(x) completely

$h(x) = x(2x+5)(x-4)^2$

*trick question - this was already factored. It's not a difference of squares. (It would be if it were (x^2-4))

b. Find the zeros of h(x)

$(0,0), (-5/2,0), (4,0)^*$

c. Highest Degree 4 (even or odd)

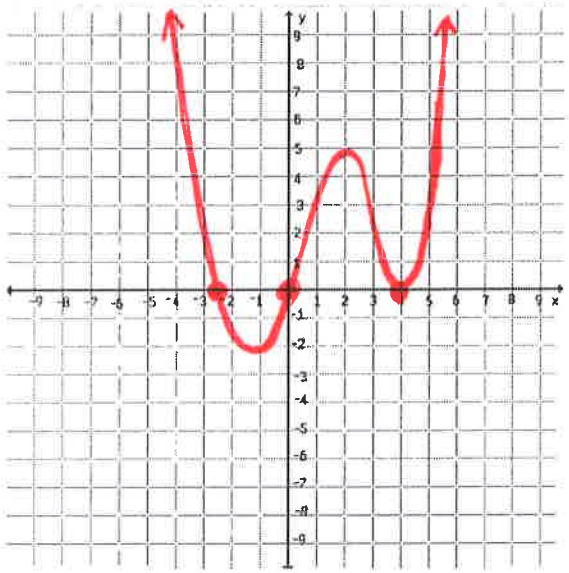
d. Leading Coefficient + (+ or –)

e. Identify the end behavior of h(x)

As x $\to \infty$, h(x) $\to \infty$

As x $\to -\infty$, h(x) $\to \infty$

f. Draw a rough sketch of h(x)



Example 4: Given $m(x) = (-x + 3)(x^2 - 2x + 1)$

a. Factor m(x) completely

$m(x) = -(x-3)(x-1)(x-1)$

b. Find the zeros of m(x)

$(3,0), (1,0)^*$

c. Highest Degree 3 (even or odd)

d. Leading Coefficient − (+ or –)

e. Identify the end behavior of m(x)

As x $\to \infty$, m(x) $\to$

As x $\to -\infty$, m(x) $\to$

f. Draw a rough sketch of m(x)