Math 3: Lesson 2-1 Graphing Polynomial Functions (Notes)
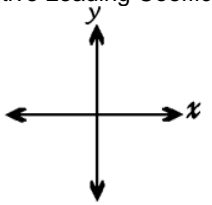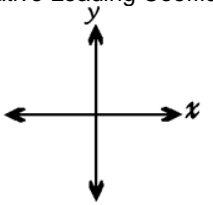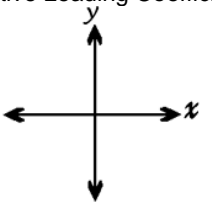
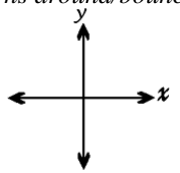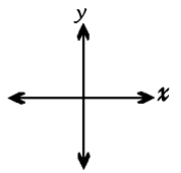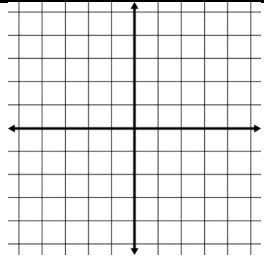| Determining the END BEHAVIOR of the graph			
Even Degree Positive Leading Coefficient	Even Degree Negative Leading Coefficient	Odd Degree Positive Leading Coefficient	Odd Degree Negative Leading Coefficient
Left _____ Right _____	Left _____ Right _____	Left _____ Right _____	Left _____ Right _____
As $x \to -\infty, y \to$ __ As $x \to \infty, y \to$	As $x \to -\infty, y \to$ __ As $x \to \infty, y \to$	As $x \to -\infty, y \to$ __ As $x \to \infty, y \to$	As $x \to -\infty, y \to$ __ As $x \to \infty, y \to$
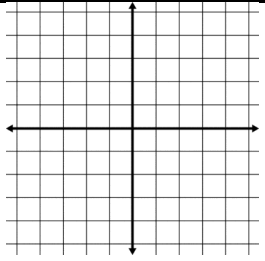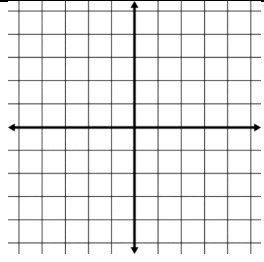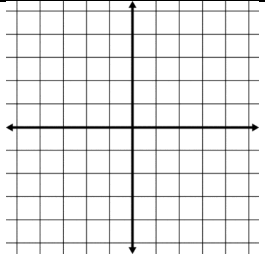
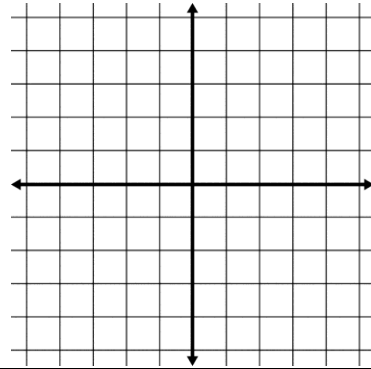| Determining the ZEROS/ROOTS/SOLUTIONS/X-INTERCEPTS of the graph	Determining the MULTIPLICITY of the zeros	
1. Write equation in standard form and set equal to zero. 2. Factor completely and set each factor equal to zero and solve (use quadratic formula if necessary. 3. If given a zero or a factor, use synthetic division to find other factors/zeros. 4. The degree indicates how many real/complex zeros there are.	**Even Multiplicity** *Touches the x-axis at the zero and then turns around/bounces*	**Odd Multiplicity** *Crosses the x-axis at the zero*

EXAMPLES: Determine the end behavior, zeros, multiplicity at each zero, and y-intercept, then draw the graph.

$P(x) = x^3 + x^2 - 6x$	$P(x) = x^3 + 3x^2 - 4x - 12$
$P(x) = (x - 3)^3(x + 1)^4$	$P(x) = -(x - 3)^3(x + 1)^2$

Given: $P(x) = 2x^3 + x^2 - 13x + 6$ and $(x - 2)$ is a factor.

$P(x) = x^3 - 8x^2 + 19x$