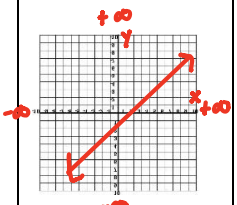
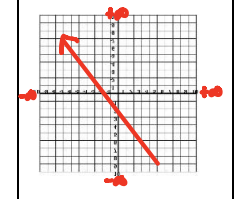
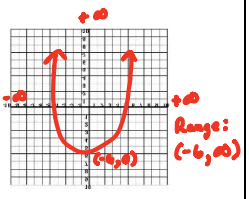
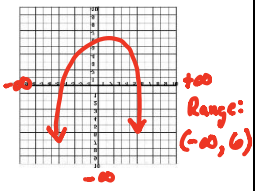
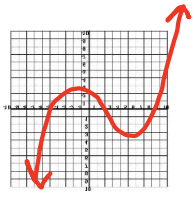
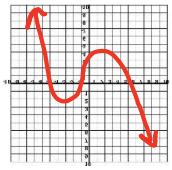
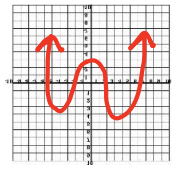
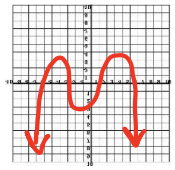
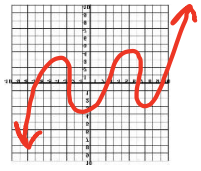
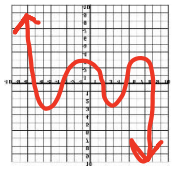
Math 3
Unit 3 Day 2 Notes - Polynomial Graphs and Zeros

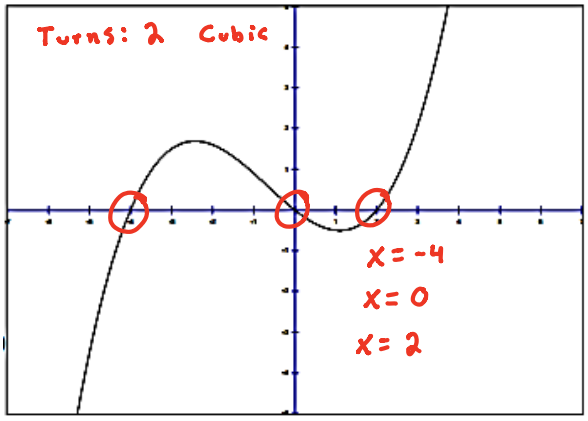
Name: Key
Date: _____

The degree of a polynomial function gives a lot of information...

	$y = ax$ ...	$y = ax^2$ ...	$y = ax^3$ ...	$y = ax^4$ ...	$y = ax^5$ ...
Type of Polynomial Function	ODD LINEAR	EVEN QUADRATIC	ODD CUBIC	EVEN QUARTIC	ODD QUINTIC
Domain Range	$(-\infty, \infty)$ $(-\infty, \infty)$	$(-\infty, \infty)$ Based on min/max	$(-\infty, \infty)$ $(-\infty, \infty)$	$(-\infty, \infty)$ Based on min/max	$(-\infty, \infty)$ $(-\infty, \infty)$
Maximum number of solutions/zeros (this is equal to the degree of the polynomial)	1	2	3	4	5
Maximum number of turns in the graph (this is one less than the degree of the polynomial)	0	1	2	3	4
Possible shape of the graph *Positive a* *Negative a*	 	 Range: $(-6, \infty)$  Range: $(-\infty, 6)$	 	 	 
End behavior *Positive a* *Negative a*	ODD $x \to -\infty \quad y \to -\infty$ $x \to \infty \quad y \to \infty$ $x \to -\infty \quad y \to \infty$ $x \to \infty \quad y \to -\infty$	EVEN $x \to -\infty \quad y \to \infty$ $x \to \infty \quad y \to \infty$ $x \to -\infty \quad y \to -\infty$ $x \to \infty \quad y \to -\infty$	ODD $x \to -\infty \quad y \to -\infty$ $x \to \infty \quad y \to \infty$ $x \to -\infty \quad y \to \infty$ $x \to \infty \quad y \to -\infty$	EVEN $x \to -\infty \quad y \to \infty$ $x \to \infty \quad y \to \infty$ $x \to -\infty \quad y \to -\infty$ $x \to \infty \quad y \to -\infty$	ODD $x \to -\infty \quad y \to -\infty$ $x \to \infty \quad y \to \infty$ $x \to -\infty \quad y \to \infty$ $x \to \infty \quad y \to -\infty$

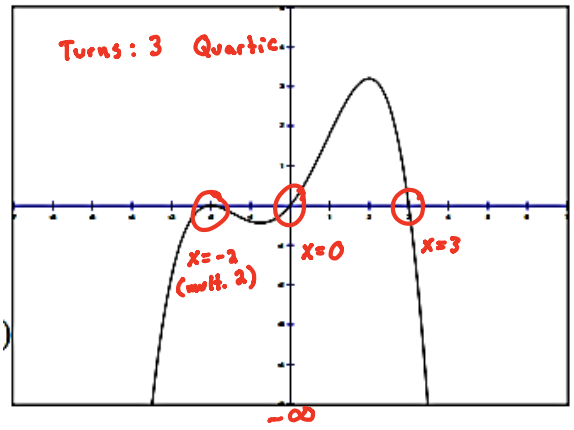
Zeros of a Polynomial Function

Part 1: Look at the graph and state the x-intercepts; watch out for repeated roots!



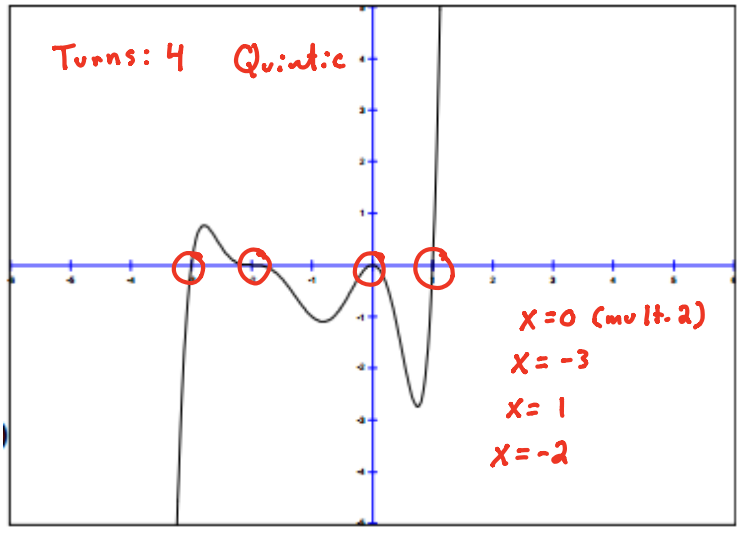
x-intercepts: (-4, 0) (0, 0) (2, 0)

Factored equation: $x(x+4)(x-2)$



x-intercepts: (-2, 0)(0, 0)(3, 0)

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



x-intercepts: (0, 0) (-3, 0) (1, 0) (-2, 0)

equation: $x^2(x+3)(x-1)(x+2)$

Part 2: Use the calculator to find any exact roots.

A) $f_{(x)} = x^3 - 6x^2 + 11x - 6$

Zeros: $x=1 \quad x=2 \quad x=3$

B) $f_{(x)} = x^3 - 9x^2 + 27x - 27$

Zeros: $x = 3$ (mult. 3)

C) $f_{(x)} = x^3 - 9x^2 + 20x - 12$

Zeros: $x=1 \quad x=2 \quad x=6$

Factored Form of each function

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

B) $(x-3)^3$

C) $(x-1)(x-2)(x-6)$