U1 L5A Analyzing Graphs of Functions

Name: _____ HR: _____

Skills: Use the Vertical Line Test, find zeros, determine increasing/decreasing intervals, find average rate of change, and identify even/odd functions.

Warm-Up: Prerequisite Skills

You'll use these three skills constantly in this lesson — make sure they're solid before we start.

1. Evaluating f(−x)	***2. Distributing a Negative***	***3. Factoring a Trinomial***
Ex: $f(x) = x^2 - 3x$. Find $f(-2)$.	Ex: $-(x^3 - 4x)$ =	Ex: factor $x^2 - 5x + 6$.
Ex: $f(x) = 2x^3 + x$. Find $f(-1)$:	Ex: $-(2x^2 - 5x + 1)$=	Ex: Factor $x^2 - 7x + 10$:

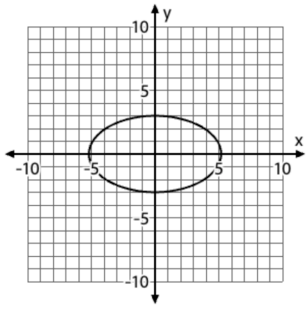
Vocabulary

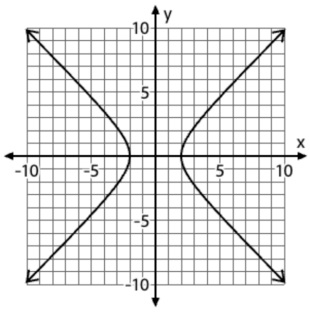
• Zeros of a function — the x-values for which f(x) = 0 (also the x-intercepts)	• Increasing / Decreasing / Constant — describes whether a graph rises, falls, or stays flat when read left to right	• Relative Minimum / Maximum — a point where the graph changes from decreasing to increasing (or increasing to decreasing)
• Average Rate of Change — the slope of the secant line through two points on a graph •	• Even function: If f(−x) = f(x) (symmetric about the y-axis)	• Odd function: f(−x) = −f(x) (symmetric about the origin)

The Vertical Line Test & Zeros of a Function

Vertical Line Test

If any vertical line cross a graph more than once, the graph does NOT represent a function.





Ex: Find the zeros of f(x) = x² − 9x + 14. Using Desmos

You try: Find the zeros of f(x) = 3x² − 16x + 21. Using TI-84

Determining Zeros Algebraically

Finding Zeros of functions Algebraically

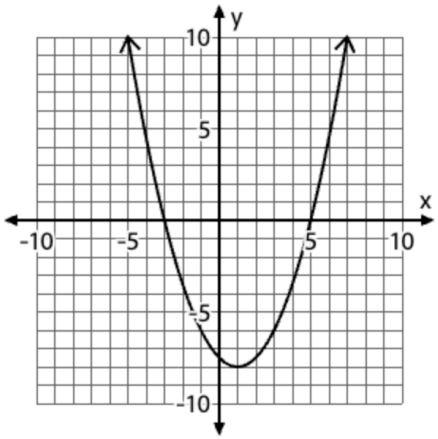
a. $f(x) = x^2 - 9x + 14$.	***b.*** $f(x) = \sqrt{15 - x^2}$	***c.*** $f(x) = \dfrac{x^2 - 7x + 6}{x - 3}$

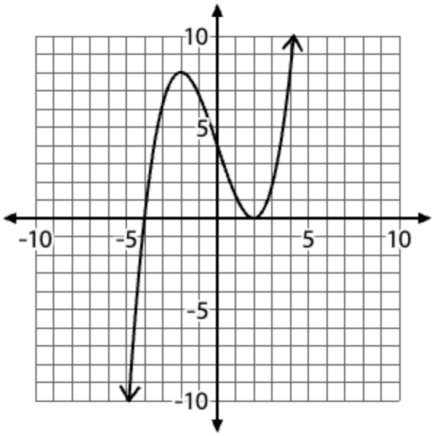
Finding Zeros of functions Algebraically

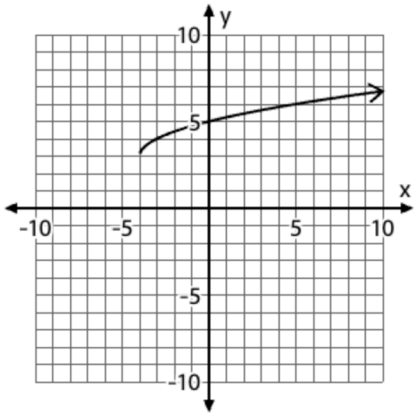
a. $f(x) = \dfrac{(x-5)(x+4)^2}{x+1}$.	***b.*** $f(x) = \sqrt{5x+12}$	***c.*** $f(x) = 4x^2 - 100$

Increasing, Decreasing, and Relative Extrema

A relative minimum/maximum happens exactly where a graph switches from decreasing to increasing (or increasing to decreasing).







Domain: *Range:*

Increasing:

Decreasing:

Local min/max of _____ at $x =$

Increasing:

Decreasing:

Local min/max:

Increasing:

Decreasing:

Local min/mas:

Definition-Range: The set of all output values of the function.

Directions: *Determine the asked for quantities using a graphing calculator or demos.*

a. $f(x) = f(x) = -x^2 - 4x + 3.$ ***Domain:*** ***Range:*** ***Increasing:*** ***Decreasing:*** ***Local min/max:*** ***Zeros:*** ***Y-intercept:***	***b.*** $f(x) = -3\sqrt{6-x}$ ***Domain:*** ***Range:*** ***Increasing:*** ***Decreasing:*** ***Local min/max:*** ***Zeros:*** ***Y-intercept:***	***c.*** $f(x) = \dfrac{(x-4)(x+6)}{x-4}$ ***Domain:*** ***Range:*** ***Increasing:*** ***Decreasing:*** ***Local min/max:*** ***Zeros:*** ***Y-intercept:***