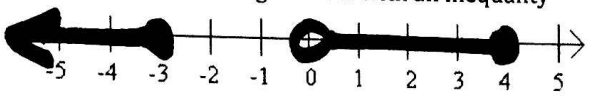
Name_____

Pre-Calculus Honors
Objective 1.3: Properties of Functions

Ms. Hindal
Unit 1 Day 3

Do Now-

1. Describe the following interval with an inequality



$X \leq -3$ or $0 < x \leq 4$

2. Describe the same interval with interval notation

$(-\infty, -3] \cup (0, 4]$

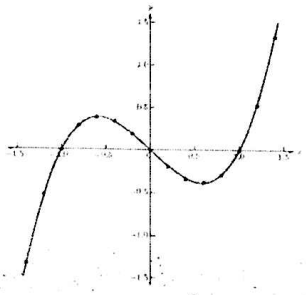
3. If $s(x) = (x^2 + 9)/3$, find the value(s) of x that makes $s(x) = 15$

$x = \pm 6$

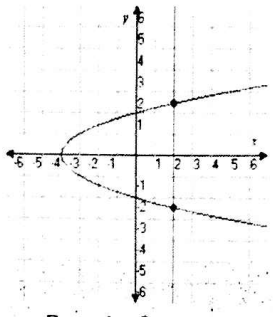
Functions:

Function - a relationship between two variables where there is exactly one output for each input

No two points on a graph of a *function* can lie the same vertical line



Function? Yes



Function? no

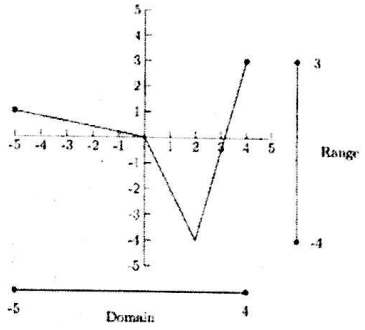
Intervals of Functions:

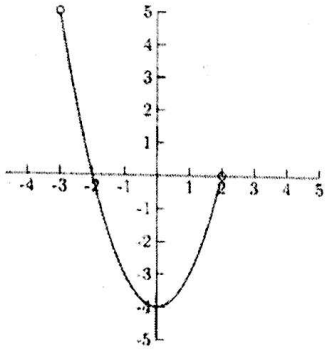
Domain – the set of x - values where the function exists

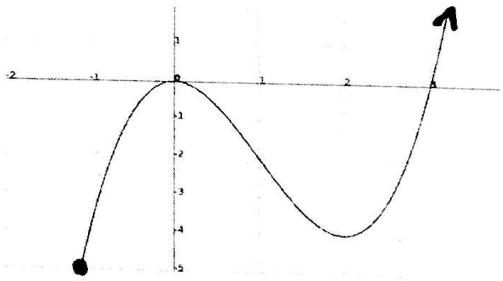
Range - the set of y - values where the function exists

Increasing - a function is increasing where output increases as input increases (left to right)

Decreasing - a function is decreasing where output decreases as input increases (left to right)







Domain: $[-5, 4]$
Range: $[-4, 3]$
Increasing: $[2, 4]$
Decreasing: $[-5, 2]$

Domain: $(-3, 2)$
Range: $[-4, 5)$
Increasing: $[0, 2)$
Decreasing: $(-3, 0]$

Domain: $[-1, \infty)$
Range: $[-5, \infty)$
Increasing: $[-1, 0] \cup [2, \infty)$
Decreasing: $[0, 2]$

Name_____

Regions of Functions:

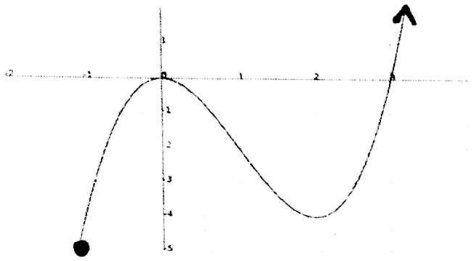
***Extrema*:**

***Maximum*:** largest y- value of the function

***Minimum*:** smallest y- value that the function

***Absolute/global extrema*:** largest or smallest value on the whole graph

***Relative/local extrema*:** largest or smallest value in an area



List Extrema:

absolute min of -5 @ x = -1
local max of 0 @ x = 0
local min of -4 @ x = 2

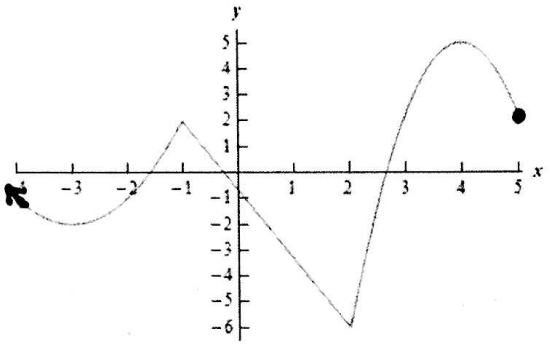
x → ∞ f(x) → ∞

***End Behavior*:**

What happens at the ends! of the function

x → ∞ f(x) →

x → -∞ f(x) →



List Extrema:

local mins @ (-3, -2) and (5, 2)
local maxs @ (-1, 2) & (4, 5)
absolute min @ (2, -6)

x → -∞ f(x) → ∞

Whole Functions:

Continuous – a function is continuous if you can trace the entire graph without lifting your pencil

Discontinuous - a function is discontinuous if cannot trace the entire graph without lifting your pencil

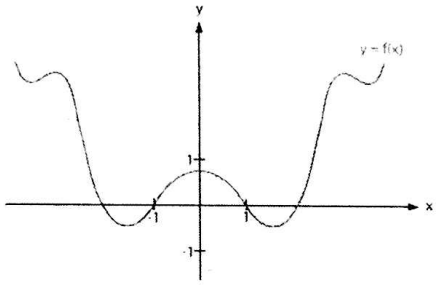
Even – a function is even if it is symmetric across the y-axis (when f(-x) = f(x))

Odd – a function is odd if it is symmetric across the origin (when f(-x) = -f(x))

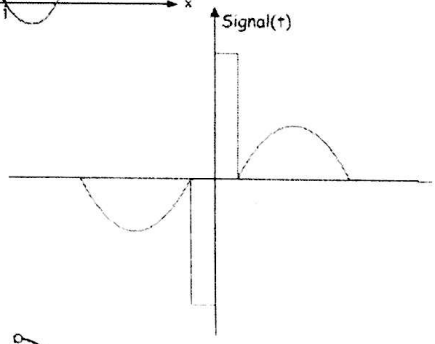
Lower Bounded – a function is lower bounded if you can draw a horizontal line below the entire function

Upper Bounded – a function is upper bounded if you can draw a horizontal line above the entire function

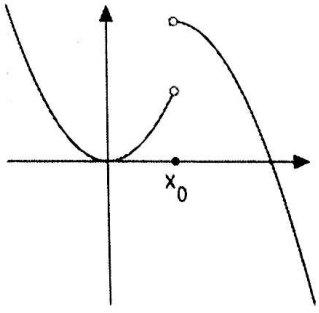
Bounded – a function is bounded if it is both lower and upper bounded



← Continuous? yes
← Even/Odd? even
← Bounded? lower



Continuous? → no
Even/Odd? → odd
Bounded? → bounded



← Continuous? no
← Even/Odd? neither
← Bounded? no → unbounded