

# 1.3 - Intervals

When analyzing graphs, we often examine the graph in sets, called intervals.

An Interval is a section of a graph between two  $x$  values

Increasing and Decreasing Behavior – an interval of a function in which the graph of the function is either increasing (rising), decreasing (falling), or constant (flat).

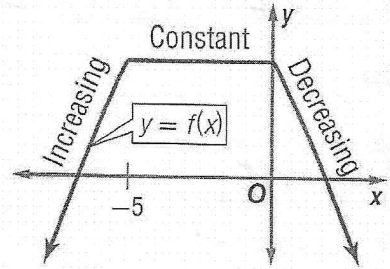
## Example 1 Identifying Intervals

As the graph moves from left to right we can conclude that  $f(x)$  is:

-increasing on  $(-\infty, -5)$

-constant on  $(-5, 0)$

-decreasing on  $(0, \infty)$



Example 2 Use the graph to estimate intervals in which the function is *increasing*, *decreasing*, or *constant*. Support Numerically.

$$f(x) = -2x^3$$

Intervals –  $(-\infty, \infty)$  decreasing

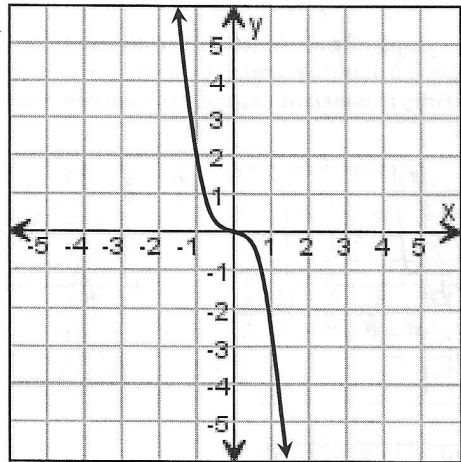


Table of values within the interval

$x$	-3	-1	0	1	3
$f(x)$	54	2	0	-2	-54

Example 3  $f(x) = x^3 - 3x$

Intervals -  $(-\infty, -1)$  increasing  
 $(-1, 1)$  decreasing  
 $(1, \infty)$  increasing

$(-\infty, -1)$

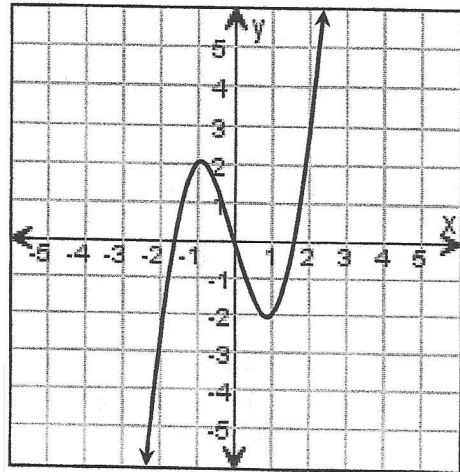
x	-4	-3	-2	-1.5
f(x)	-52	-18	-2	1.125

$(-1, 1)$

x	-1/2	0	1/2	
f(x)	1.375	0	-1.375	

$(1, \infty)$

x	1.5	2	3	4
f(x)	-1.125	2	18	52



Use the graph of each function to estimate intervals to the nearest 0.5 unit on which the function is increasing, decreasing, or constant. Support the answer numerically. (Example 1)

