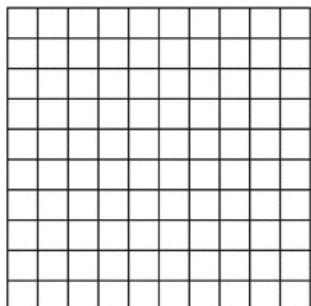


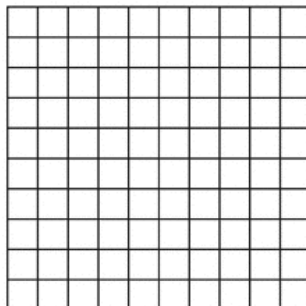
Aim: How do we know when functions are increasing? decreasing?

I. Do Now:

1. $f(x) = \begin{cases} -x, & x < 0 \\ x, & x \geq 0 \end{cases}$



2. $g(x) = \begin{cases} -x+1, & x \leq 0 \\ 1, & 0 < x \leq 2 \\ x-1, & x > 2 \end{cases}$



For what values of x is $g(x)$

(a) increasing?

(b) decreasing?

(c) constant?

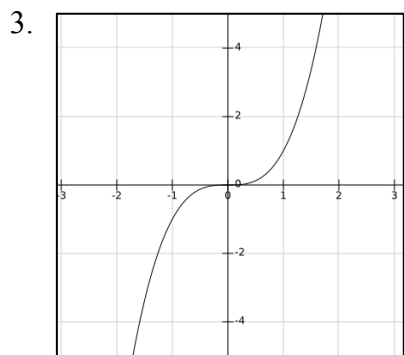
II. Definitions and Terminology:

A function f is

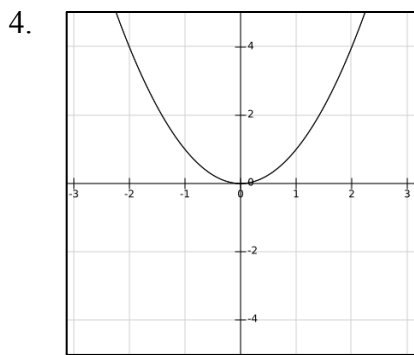
- (i) **increasing** on an interval if, for any x_1 and x_2 in the interval, $x_1 < x_2$ implies that $f(x_1) < f(x_2)$.
- (ii) **decreasing** on an interval if, for any x_1 and x_2 in the interval, $x_1 < x_2$ implies _____.
- (iii) **constant** on an interval if, for any x_1 and x_2 in the interval, _____.

III. Applications. Determine the open intervals over which the function $f(x)$ is

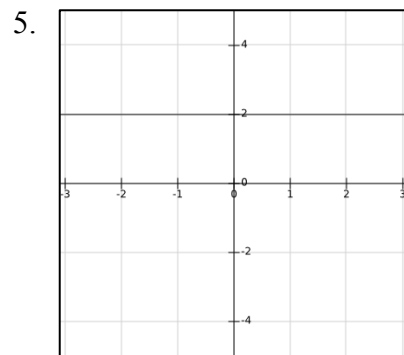
(a) increasing (b) decreasing (c) constant



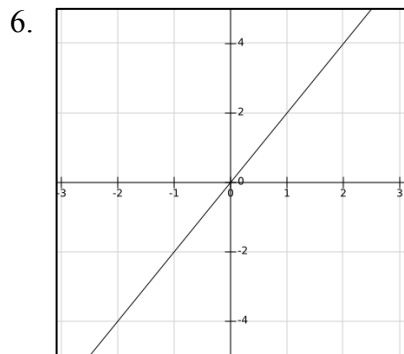
Increasing: _____
 Decreasing: _____
 Constant: _____



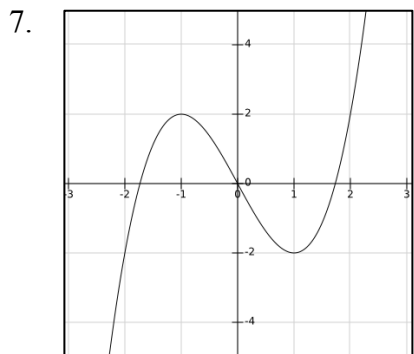
Increasing: _____
 Decreasing: _____
 Constant: _____



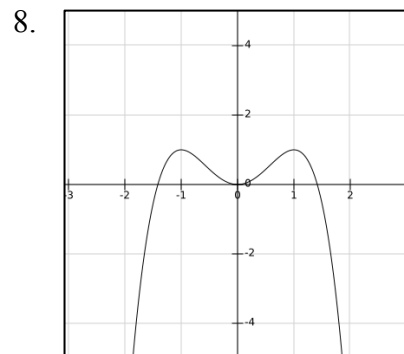
Increasing: _____
 Decreasing: _____
 Constant: _____



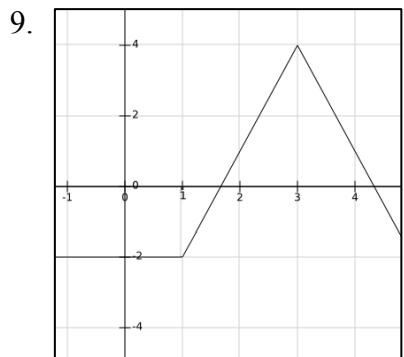
Increasing: _____
 Decreasing: _____
 Constant: _____



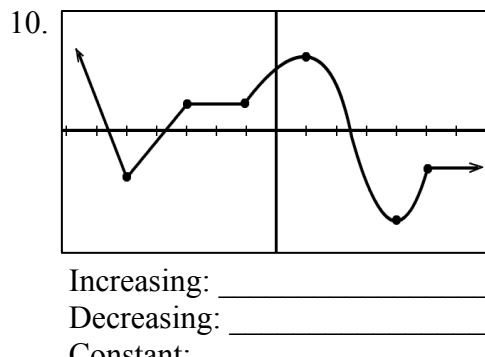
Increasing: _____
 Decreasing: _____
 Constant: _____



Increasing: _____
 Decreasing: _____
 Constant: _____



Increasing: _____
 Decreasing: _____
 Constant: _____



Increasing: _____
 Decreasing: _____
 Constant: _____

11. Sketch a graph of a function $f(x)$ that satisfies the following conditions:
- (i) increasing on $(-\infty, -1)$
 - (ii) decreasing on $(-1, 1)$ and $(3, \infty)$
 - (iii) constant on $(1, 3)$
 - (iv) $f(-2) = -3$ and $f(2) = 3$