## Spiral Review:

Using the graphing calculator, graph the function and find the x-intercepts.

1. $f(x) = x^3 + 2x$

$(0,0)$

$x=0$

2. $f(x) = x^2 - x^4$

$(-1,0)$ $x=-1$

$(0,0)$ $x=0$

$(1,0)$ $x=1$

## p.29 1.3 Graphs of Functions

**Review:** Using graphing calculator, find the domain and range of the function.

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

D: $(-\infty, \infty)$

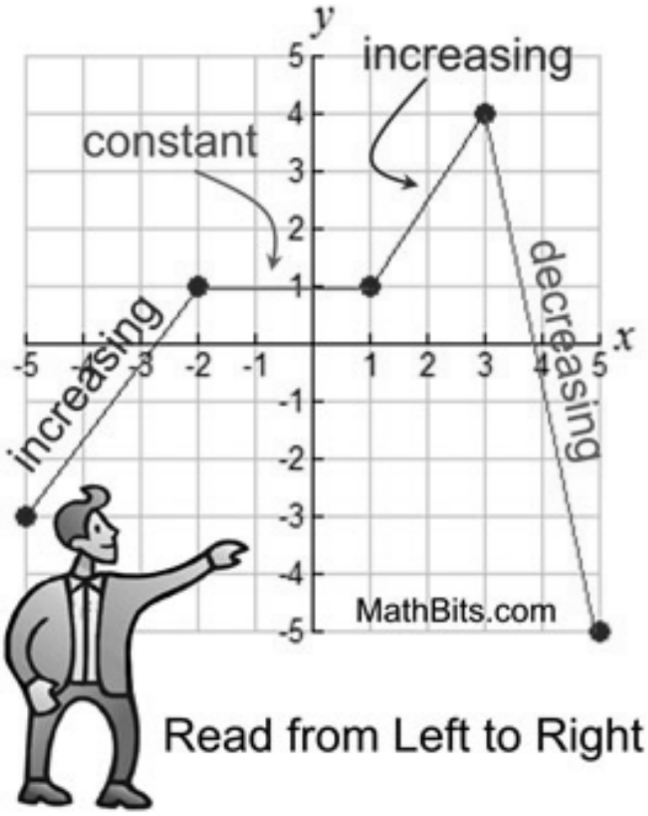
R: $(-\infty, 3]$

b.) $f(x) = \sqrt{x-9}$

D: $[9, \infty)$

R: $[0, \infty)$

# Increasing and Decreasing Functions:



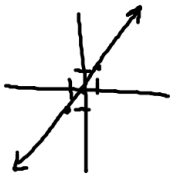

Increasing: as the value of "x" increases, <u>the value of "y" increases.</u>

Decreasing: as the value of "x" increases, <u>the value of "y" decreases.</u>

Constant: as the value of "x" increases, <u>the value of "y' stays constant.</u>

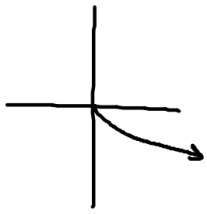
**Example 1:** (a) graph the function using graphing calculator (b) determine <u>open</u> intervals on which the function is increasing, decreasing, or constant.

a.) $f(x) = x$



increasing
$(-\infty, \infty)$

b.) $f(x) = -x^{3/4}$

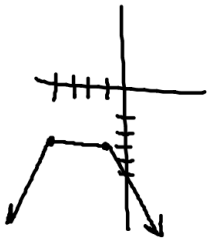


decreasing
$(0, \infty)$

c.) $f(x) = x\sqrt{3-x}$

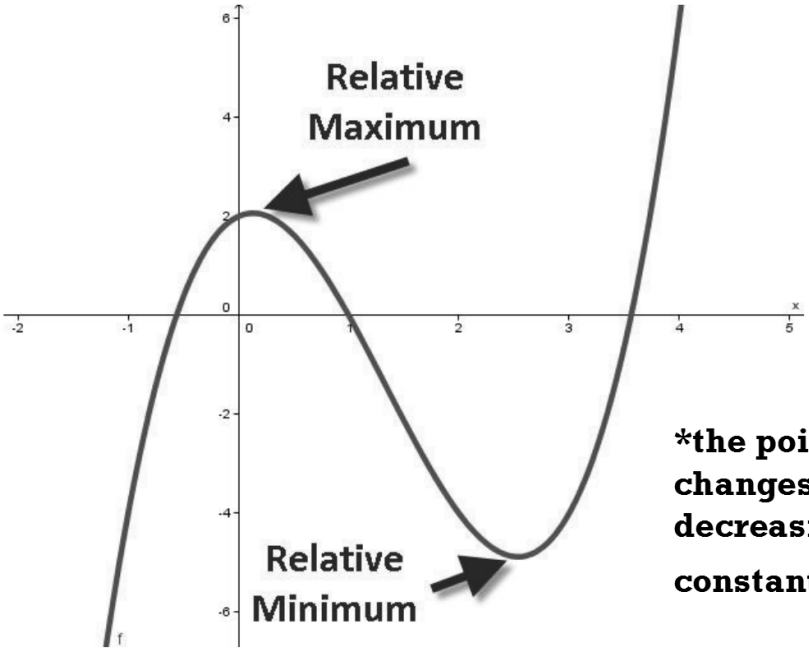
increasing
$(-\infty, 2)$
decreasing
$(2, 3)$

d.) $f(x) = -|x+4| - |x+1|$



increasing
$(-\infty, -4)$
constant
$(-4, -1)$
decreasing
$(-1, \infty)$

**Using graphing calculator to find relative maximum and relative minimum:**




***the points at which a function changes its increasing, decreasing, or constant behavior**

**Example 2:** Using graphing calculator to graph the function and to approximate any relative minimum or relative maximum. (2 decimal places)

a.) f(x)= $3x^2 - 2x - 5$

min: (.33, -5.33)

b.) $g(x) = x\sqrt{4-x}$

max: (2.67, 3.08)

c.) $y = x^3 - 6x^2 + 15$

min: (4, -17)

max: (0, 15)

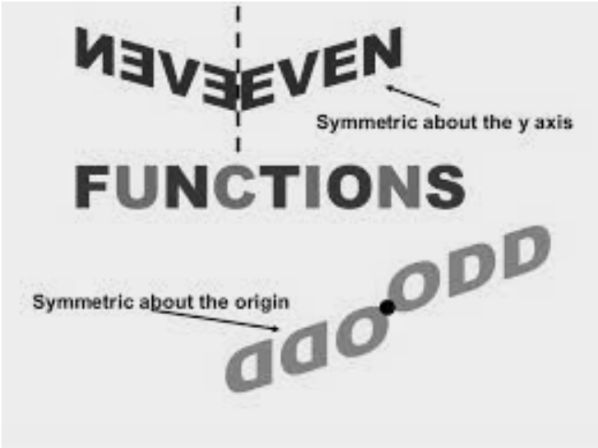
d.) $f(x) = -x^3 + 3x^2$

min: (0, 0)

max: (2, 4)

Determining whether a function is even, odd, or neither.

Graphically:




Even:

(4, 5) ---> (-4,5)

* x-value changes signs

Odd:

(4,5) ---> (-4,-5)

* both values change signs

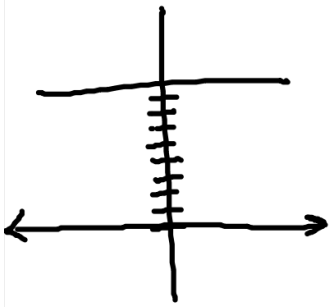
Algebraically:

**even:** if f(-x) = f(x)

**odd:** if f(-x) = - f(x)

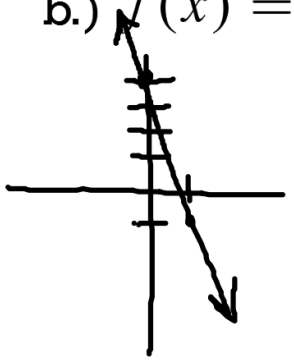
**Example 3:** Using graphing calculator, determine whether it is even, odd, or neither.

a.) $f(x) = -9$



even

b.) $f(x) = 4 - 5x$

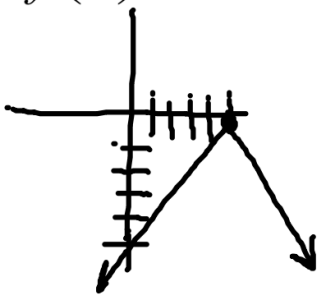


neither

c.) $f(x) = \sqrt[3]{t-1}$

neither

d.) $f(x) = -|x-5|$



neither

**Example 4:** Find the coordinates of a second point on the graph of a function given the point is on the graph and the function is (a) even and (b) odd

a.) (5, -1)

even: $(-5,-1)$

odd: $(-5,1)$

b.) (2a,2c)

even: $(-2a,2c)$

odd: $(-2a,-2c)$

**Example 5:** Determine whether the function is even, odd, or neither (a) algebraically (b) graphically

a.) $h(x) = x^5 - 4x^3$

ⓐ $h(-x) = (-x)^5 - 4(-x)^3$

$= -x^5 + 4x^3$

odd

ⓑ odd

b.) $f(x) = x\sqrt{x+5}$

ⓐ $f(-x) = -x\sqrt{-x+5}$

neither

ⓑ neither

Turn-in Problems:

p.38 (24, 42, 68, 86)

HW Assignment:
p.38 (27-45,63-75,79-85,119 odds)

a and b
only