

1.3: PROPERTIES of FXNS

Notes
9/20/16

ASSIGNMENT:

1.3: 13-20,

21-25 odd,

29, 31, 33, 35, 38

I Even/Odd fxns

$f(-x) = f(x) \Rightarrow$ even / graph has symmetry about the y axis

$f(-x) = -f(x) \Rightarrow$ odd / graph is symmetric about origin
"reflected about both the x and y axis"

ex) Is $f(x) = x^2 - 5$ even, odd, or neither?

check by substituting $-x$ for x

$$f(-x) = (-x)^2 - 5$$

Do the math

$$= x^2 - 5 \Rightarrow \text{is our original function } f(x)$$

since $f(x) = f(-x)$, then $f(x)$ is even

ex) $g(x) = x^3 - 1$; even, odd, or neither?

$$g(-x) = (-x)^3 - 1 = -x^3 - 1$$

$$-x^3 - 1 \neq f(x) \quad \therefore g(x) \text{ is neither}$$

$$-x^3 - 1 \neq -f(x)$$

ex) $h(x) = 5x^3 - x$; even, odd, or neither?

$$h(-x) = 5(-x)^3 - (-x)$$

$$= -5x^3 + x \Rightarrow \text{this is the same as } -h(x)$$

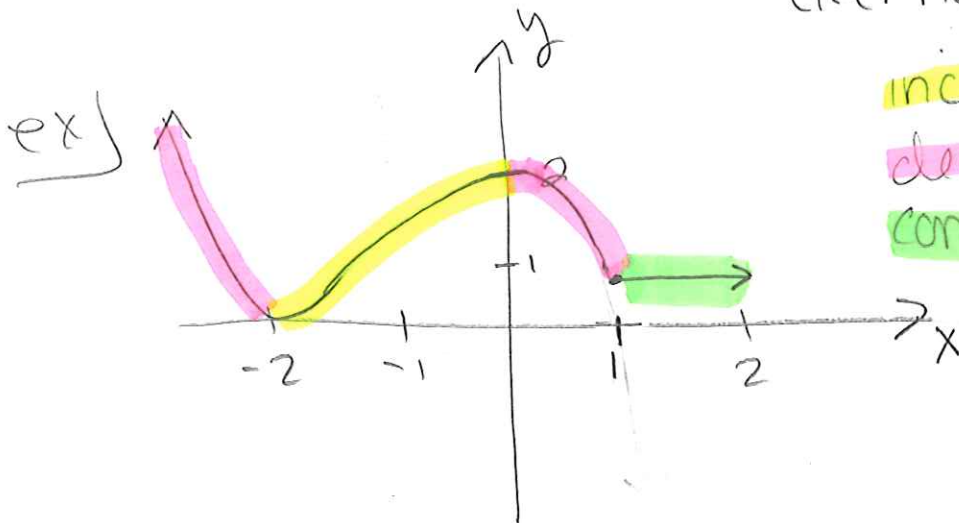
$$\rightarrow -h(x) = -(5x^3 - x) = -5x^3 + x$$

$\therefore h(x)$ is odd.

Increasing/Decreasing Intervals

When looking at a graph - in which intervals is it...

- increasing: slope is (+) or y values are getting bigger
- decreasing: slope is (-) or y values are getting smaller
- constant: slope is zero (i.e. horizontal line)



increasing on $(-2, 1)$

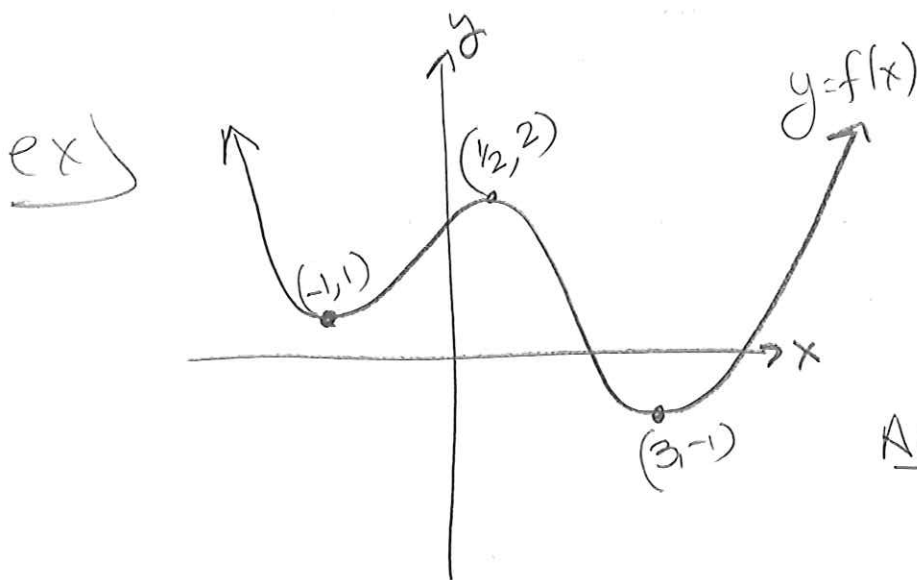
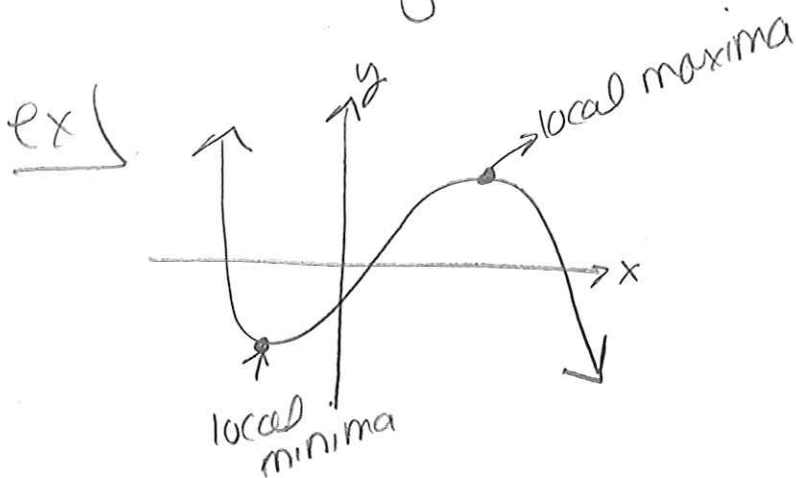
decreasing on $(-1, 0), (0, 1)$

constant on $(1, \infty)$

III local maxima, local minima

local maxima is a maximum value on an interval of a fn.

local minima is a minimum value on an interval of a fn.



a) At what value(s) of x does $f(x)$ have a local max? List the values.

ANS: @ $x = 1/2$, $f(x)$ has a local max. of 2.

b) At what value(s) of x does $f(x)$ have local minima(s)? List the values.

ANS: at $x = -1, 3$ $f(x)$ has local mins. of 1 and -1

c) find intervals where $f(x)$ is increasing + decreasing.

ANS: I: $(-1, 1/2), (3, \infty)$, D: $(-\infty, -1), (1/2, 3)$

