hw-16-properties-of-functions

Due: **12/13/2015 at 06:00am EST.**

Students will be able to:

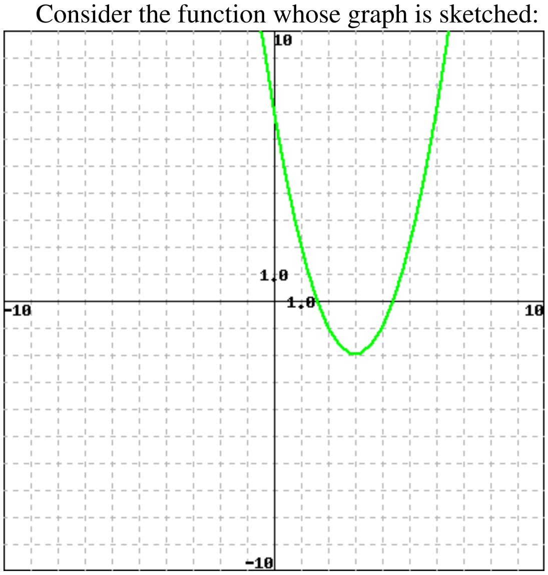
- Determine Increasing/Decreasing Intervals of Function
- Determine Local Maximum/Minimum Values of Function
- Identify Even and Odd Functions
- Determine Symmetry of Function

Functions and symbols that WeBWorK understands.

Links to some useful WeBWorK pages for students

1. (1 pt)

Consider the function whose graph is sketched:

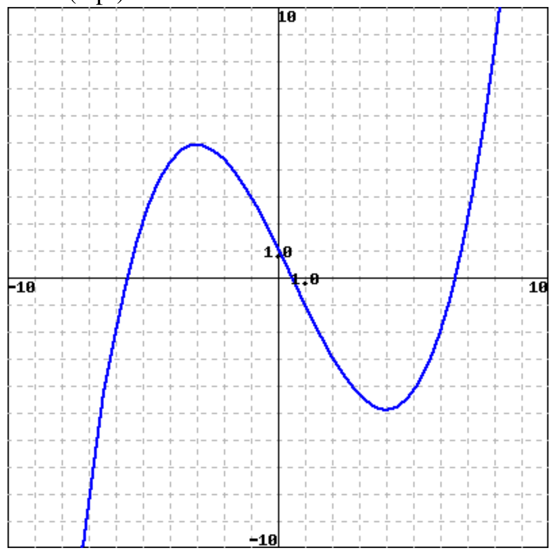


Find the open intervals over which the function is increasing or decreasing.
Write the answers in **interval notation**.
The open $x-$intervals over which the function is increasing: __________

The open $x-$intervals over which the function is decreasing: __________

Function has local maximum at $x =$ __________
Function has local minimum at $x =$ __________
Note: if there are no such points, enter *none*

2. (1 pt) Consider the function shown in the following graph.



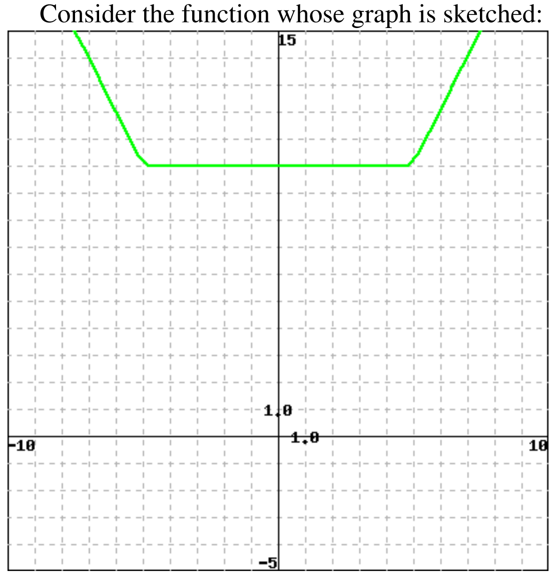
Find open $x-$intervals where the function is decreasing: __________

Find open $x-$intervals where the function is increasing: __________

Note: use **interval notation** to enter your answer.
Function has local maximum at $x =$ __________
Function has local minimum at $x =$ __________
Note: if there are no such points, enter *none*

3. (1 pt)

Consider the function whose graph is sketched:



Find the open intervals over which the function is increasing or decreasing.
Write the answers in **interval notation**.

The open $x-$intervals over which the function is increasing: __________

The open $x-$intervals over which the function is decreasing: ______________

4. (1 pt) Determine algebraically whether each functions is even, odd, or neither

$\boxed{?}$ 1. Function $f(x) = -5x^3$ is ...
$\boxed{?}$ 2. Function $f(x) = -5x^5$ is ...
$\boxed{?}$ 3. Function $f(x) = 8x^4$ is ...
$\boxed{?}$ 4. Function $f(x) = -3x^2 - 9$ is ...

5. (1 pt)

For the following functions, enter **E** if they are even, **O** if they are odd, and **N** if they are neither even nor odd.

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

6. (1 pt)

Use E for Even and O for Odd and N for Neither Let

$$h = f \times g,$$

i.e., h is the product of f and g. Then
h is ___ if f and g are both even,
h is ___ if f is even and g is odd, and
h is ___ if f and g are both odd.

7. (1 pt)

A function f is *even* if it satisfies $f(x) = f(-x)$ for all x in its domain. An example of an even function is $f(x) = x^2$ since $(x^2) = (-x)^2$.

f is *odd* if it satisfies $f(x) = -f(-x)$ for all x in its domain. An example of an odd function is $f(x) = x^3$ since $x^3 = -(-x)^3$.

Functions may be neither even nor odd, for example the function $f(x) = x^2 + x^3$ is in that category.

For each function below enter the letter **E** if the function is even, the letter **O** (not the digit 0!) if it's odd, and the letter **N** if it's neither even nor odd.

___ $f(x) = x^4$.
___ $f(x) = x^5$.
___ $f(x) = x^4 + x^5$.

8. (1 pt) Below, enter x if the graph of the given equation is symmetric with respect to the x-axis, y if it is symmetric with respect to the y axis, o (lower case O) if it is symmetric with respect to the origin, and n (for None) if it has none of these three symmetries.

___ $y = x^3 + x$
___ $y = (x^3 + 1)^2$
___ $y = \frac{1}{1+x^2}$
___ $y = \frac{x}{1+x^2}$.