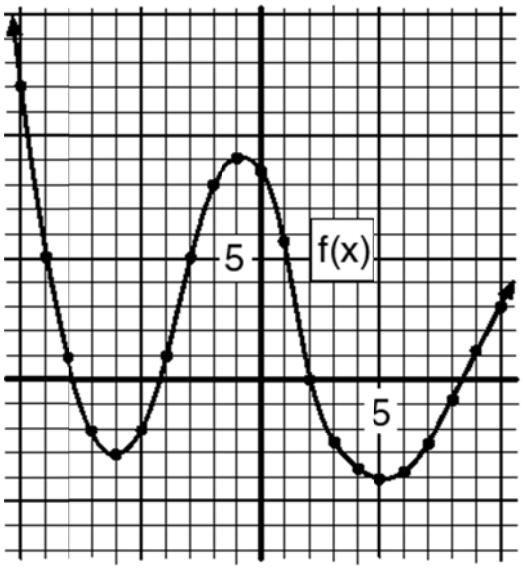
Increasing and decreasing functions **NAME:**

1. The function $f(x)$ is below. Complete the table by finding the $f(x)$ values for the given values of x. The points are plotted to help you. *Round answers to the nearest tenth.*



x	$f(x)$ or y		x	$f(x)$ or y
-10			**0**	
-9			**1**	
-8			**2**	
-7			**3**	
-6			**4**	
-5			**5**	
-4			**6**	
-3			**7**	
-2			**8**	
-1			**9**	
			10	

2. We want to think about the y-values as we go down the table.

Notice how the y-values in the table get smaller (decrease) as x goes from -10 to -6, then the y-values start to get bigger (increase). Go back to the table and mark where the y-values are increasing and where they are decreasing. Place a star next to each x-value where the corresponding y-value is a local maximum or minimum. Write those x-values down here.

3. When we talk about where a graph increases or decreases, **we look at what is happening to the *y*-values but we write down the intervals of *x*-values** where we see these increases and decreases. The local maximums and minimums will be the endpoints of these intervals.

In addition, we will always use open intervals for this. That means always use parentheses, never square brackets, so that we do *not* include the endpoints in our intervals.

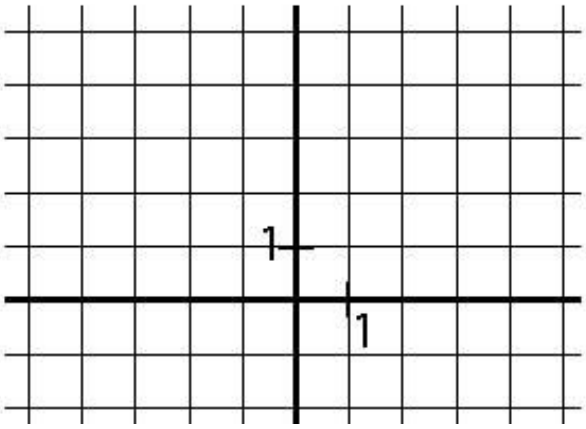
Going from left to right, determine the intervals of x where the graph is increasing or decreasing. Write your answers in interval notation.

(Hint: Since the graph is assumed to go on forever at the left and right ends, we say the graph decreases on the interval $(-\infty,-6)$ and also increases on the interval $(5,\infty)$. Again, notice that these are *x*-values. Notice we use the symbols for negative and positive infinity. Include these intervals in your answer.)

Decreasing:

Increasing:

4. Use your grapher to graph $y = .25x^4 + .3x^3 - .9x^2 + 3$. (Lots of decimal points! Be careful!) Use the same window as the graph paper below represents so it will be easier to sketch. Use the calculator's **Max** and **Min** functions to find the maximum and minimum points on the graph (the humps; you should see three). Label these points in *ordered pair notation* on or next to your graph. *Round your numbers to two decimal places (nearest hundredths place).*



Look carefully at the *y*-intercept. Your calculator may use scientific notation but you want to write it as (0, 3).

5. Now write (in interval notation) the intervals of *x*-values where the graph is increasing or decreasing. I usually start at the far left and go towards the right. *Round your numbers to two decimal places (nearest hundredths place).*

Decreasing:

Increasing: