

PC 1-3 Investigation/Notes

Students will identify local **maxima** and **minima** as well as the absolute maximum and minimum given a graph.

Students will identify intervals on which a function is **concave up** and **concave down**.

1. a) Local Maxima

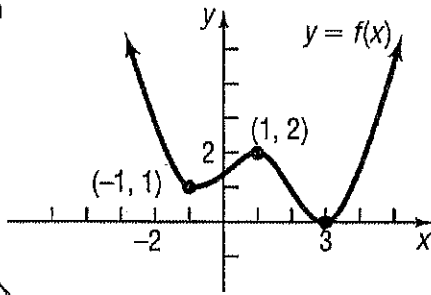
$(1, 2)$

b) Local Minima:

$(-1, 1)$

and

$(3, 0)$



c) Absolute Maximum:

N/A

d) Absolute Minimum:

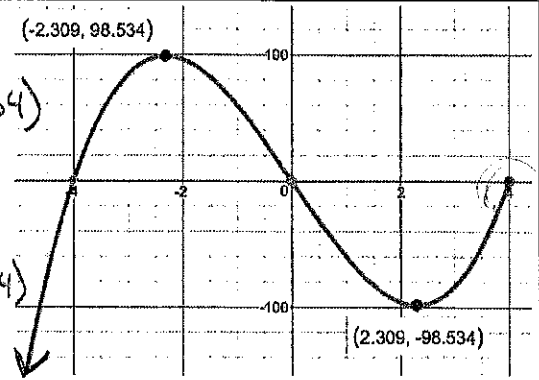
$(3, 0)$

2. a) Local Maxima:

$(-2.309, 98.534)$

b) Local Minima:

$(2.309, -98.534)$



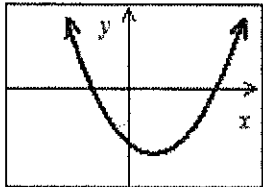
c) Absolute Maximum:

$(-2.309, 98.534)$

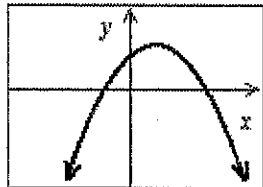
d) Absolute Minimum:

N/A

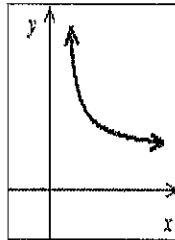
3. Decide which of the following graphs are concave up and which are concave down. Write your answer below.



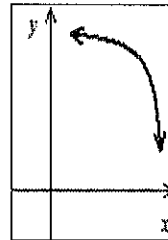
up



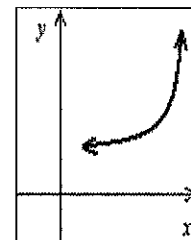
down



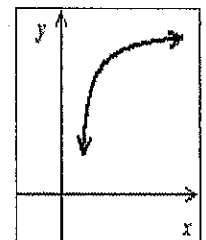
up



down



up



down

4. Indicate the intervals where the graph is...

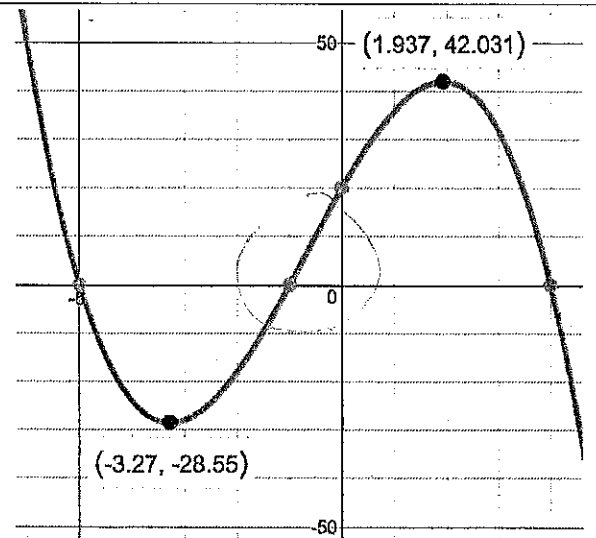
a) Concave UP

$(-\infty, -0.6665)$

$$\frac{-3.27 + 1.937}{2} = -0.6665$$

b) Concave DOWN

$(-0.6665, \infty)$



5. Write two sentences about how you determine when the graph switches from concave up to concave down.

I examine the x-values of the turning points to start the process. I then add the x-values and divide by two to determine the x-value at which the graph changes shape.

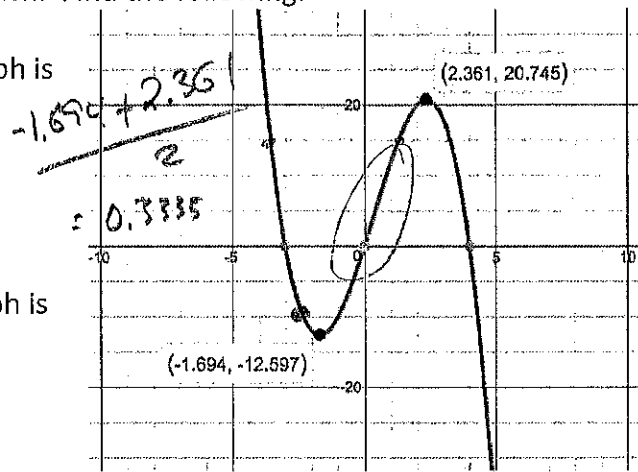
6. The graph of $f(x)$ is shown. Find the following:

a) Intervals where the graph is Concave UP

$(-\infty, 0.3335)$

b) Intervals where the graph is Concave Down

$(0.3335, \infty)$



Approx.

c) Evaluate $f(-2)$

$f(-2) \approx -10$

d) Solve $f(x) = 15$

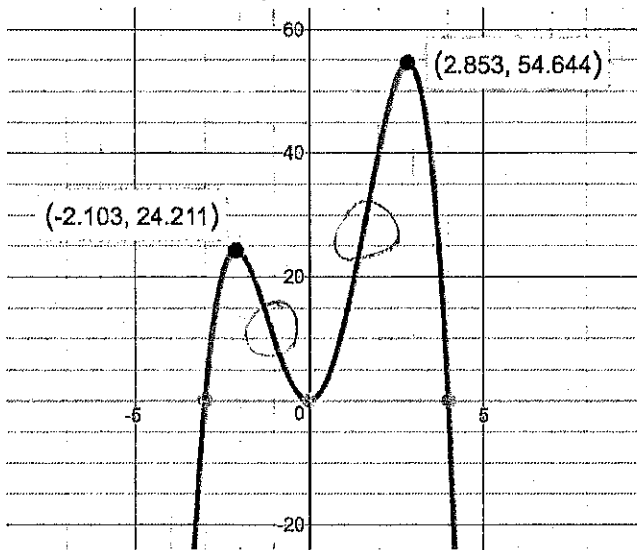
(approximate to 2 decimals)

$x \approx \{-4, 1, 3\}$

7. Determine the following given the graph.

a) Intervals for Increasing/Decreasing

b) Intervals for Concave Up/Concave Down



A) Increasing: $(-\infty, -2.103) \cup (0, 2.853)$

Decreasing: $(-2.103, 0)$

$\frac{-2.103 + 0}{2} = -1.0515$ $\frac{0 + 2.853}{2} = 1.4265$

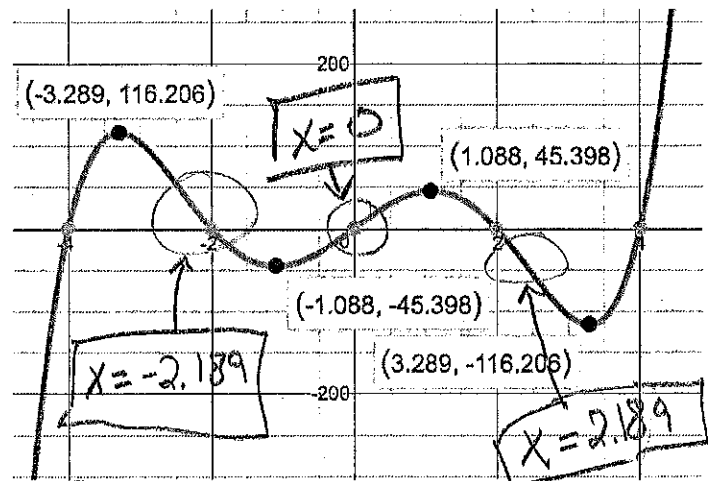
Concave Up: $(-1.0515, 1.4265)$

Concave Down: $(-\infty, -1.0515) \cup (1.4265, \infty)$

8. Determine the following given the graph.

a) Intervals for Increasing/Decreasing

b) Intervals for Concave Up/Concave Down



Increasing:

A) $(-\infty, -3.289) \cup (-1.088, 1.088) \cup (2.189, \infty)$

Decreasing:

$(-3.289, -1.088) \cup (1.088, 3.289)$

Concave Up:

$(-2.189, 0) \cup (2.189, \infty)$

Concave Down:

$(-\infty, -2.189) \cup (0, 2.189)$

9. The graph of $g(x)$ is shown. Determine the following:

a) $g(-1) = 192$

b) $g(4) = -168$

c) How many solutions does $g(x) = 0$ have?

It has 5 solutions

