

Find the extreme values of f on the given interval. Determine at which numbers in the interval they occur.

1) $f(x) = 3x^3 - 9x + 4 ; [-2, 3]$

Abs.max.value

Abs.min.occurs at

2) $f(x) = x^{2/5} + 3 ; [-32, 1]$

Abs.min.value

Abs.max.occurs at

3) Find the relative max. and min. and the intervals on which the given function is increasing and those on which it is decreasing. $f(x) = x(x-2)^2$

rel.max.

rel.min.

inc.

dec.

4) Find any inflection point and the intervals on which the function is concave upward and those on which it is concave downward.

$g(x) = x^4 - 4x^3 + 2x + 1$

inf. pt.

conc.up

conc.down

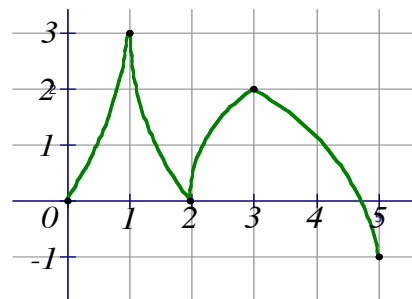
5) **From $[0,5]$ tell me about the function. (Use graph to the right)**

List the x - coordinates for each : **Find each :**

Inflection points _____	Abs. max. value _____
Relative maximum _____	Abs. min. value _____
Relative minimum _____	Abs. max. value occurs at _____
Hard points _____	Abs. min. value occurs at _____

On which interval(s) is the graph:

increasing/concave up _____
 increasing/concave down _____
 decreasing/concave up _____
 decreasing/concave down _____



6) Given $f(x) = \frac{10}{x}$, find all numbers c in the interval $(1,5)$ where the Mean Value Theorem applies.

7) $f''(x) = (x-2)^2(2x+7)$ Find where inflection point(s) occur(s) and concavity.
inf. pt. conc.up conc.down
 $x =$

8) $f'(x) = x - \frac{5}{x}$ Find where the rel. extreme values occur and when the graph increases and decreases.
rel.max. rel.min. inc. dec.
 $x =$ $x =$

9) The average cost of our product is given by $\bar{C} = 10x + \frac{400,000}{x}$.

- a) How many of our product should we make to minimize the average cost? _____
b) What is the average cost per unit? _____

Tell me what symbols represent

- 10) $f'(x) < 0$ and $f''(x) > 0$ _____
11) $f'(x) > 0$ and $f''(x) < 0$ _____
12) $f'(x) < 0$ and $f''(x) < 0$ _____
13) $f'(x) > 0$ and $f''(x) > 0$ _____

14) **Draw each graph**

- dec. /conc. down dec. /conc. up

inc. /conc. up inc. /conc. down

15) If $x = 10$ is a critical point and $f''(x) = \frac{12-x}{x+3}$, show whether $x = 10$ is a relative max. or min.