



1. Identify the points or intervals on the x axis that produce the indicated behavior.

- a. $f(x)$ is increasing _____
- b. $f(x) < 0$ _____
- c. $f(x)$ is concave down _____
- d. $f''(x) > 0$ _____
- e. local minima _____
- f. absolute maxima _____
- g. $f'(x)$ appears to be zero _____
- h. $f'(x)$ does not exist _____
- i. inflection points _____

2. Find the absolute maximum and absolute minimum values for

$$f(x) = x^4 - 2x^2 + 5 \quad [0, 2]$$

3. A firm estimates that it will sell N units of a product after spending x dollars on advertising where $N(a) = -a^2 + 300a + 5$. Find the maximum number of units that can be sold and the amount that must be spent on advertising to achieve that maximum.

4. An appliance firm is marketing a new stove. It determines that in order to sell x stoves, the price per stove must be $p = 280 - 0.4x$. It also determines that the total cost of producing x stoves is given by $C(x) = 5000 + 0.6x^2$.
- Find the revenue function $R(x)$
 - Find the number of stoves that must be sold to maximize the revenue
 - Find the maximum revenue
 - What price should the firm charge for the stoves in order to maximize the revenue?
 - Find the profit function $P(x)$
 - Find the number of stoves that must be sold to maximize the profit
 - Find the maximum profit
 - What price should the firm charge for the stoves in order to maximize the profit?
5. Given $f(x) = -x^3 + 3x - 2$
- Find the critical values
 - Make a first derivative chart and find the intervals where $f(x)$ is increasing and decreasing

- c . Find any local maxima and minima
- d. Find any points of inflection
- e. Make a 2nd derivative chart and find the intervals where $f(x)$ is concave up and concave down
- f. Find the y-intercept
- g. Using the results ,draw the graph of $f(x)$, labeling all points