

Q1.

Find any relative extrema of

$$f(x) = x^2 \sqrt{16 - x^2}$$

State where the function is increasing or decreasing and determine points of inflection.

Q2.

Find the absolute maximum and minimum values of

$$f(x) = x^2 + \frac{64}{x}$$

on $(0, +\infty)$.

Q3.

The total cost and total revenue functions are

$$C(x) = \frac{1}{2}x^3 - 10x^2 + 60x + 500$$

$$R(x) = 150x - 2x^2$$

a) Find the profit function $P(x)$ and determine the level of output for maximum profit.

b) Find $MR(x)$ and $MC(x)$.

Q4.

A cylindrical can is to have a volume of 1500 cm^3 .

Find the dimensions (radius and height) that minimize the surface area.