Answer on Question #54826 – Math – Calculus

The International Silver Strings Submarine Band holds a bake sale each year to fund their trip to the National Sasquatch Convention. It has been determined that the cost in dollars of baking x cookies is
C(x) = 0.5x + 23
and that the demand function for their cookies is
p = 14 − 0.05x.
How many cookies should they bake in order to maximize their profit?

Solution

Profit is given by

$$\boldsymbol{P(x) = px - C(x) = (14 - 0.05x)x - (0.5x + 23) =}$$

$$\boldsymbol{= -0.05x^2 + 13.5x - 23}$$

Solve the following equation

$\boldsymbol{\frac{dP(x)}{dx} = 0 \ \rightarrow \ -0.1x + 13.5 = 0 \ \rightarrow \ x = 135}$.

Calculate

$\boldsymbol{\frac{d^2P(x)}{dx^2} = \frac{d}{dx}(-0.1x + 13.5) = -0.1}$**, therefore at** $\boldsymbol{x = 135}$ **the function** $\boldsymbol{P(x)}$

attains the maximum.

They should bake 135 cookies.

Answer: They should bake 135 cookies.