

Answer on Question #56187 – Math – Calculus

The manager of a large apartment complex knows from experience that 120 units will be occupied if the rent is 372 dollars per month. A market survey suggests that, on the average, one additional unit will remain vacant for each 3 dollar increase in rent. Similarly, one additional unit will be occupied for each 3 dollar decrease in rent. What rent should the manager charge to maximize revenue?

Solution

Let's find a function of revenue. It will be

$f(x) = (372 + 3x)(120 - x)$, where x is the number of additional or remain vacant units.

To find a max revenue we need to find critical points of the derivative.

Derivative function is $f'(x) = (44640 - 12x - 3x^2)' = -12 - 6x$.

A critical point: $-12 - 6x = 0$. So $x = -2$.

The second derivative function is $f''(x) = (-12 - 6x)' = -6 < 0$

So maximal revenue will be when amount rent cost is 366 dollars per month (122 units).

Answer: 366 dollars per month.