Answer on Question #44916 – Math - Calculus

The manager of a large apartment complex knows from experience that 120 units will be occupied if the rent is 420 dollars per month. A market survey suggests that, on the average, one additional unit will remain vacant for each 10 dollar increase in rent. Similarly, one additional unit will be occupied for each 10 dollar decrease in rent. What rent should the manager charge to maximize revenue?

Answer.

Let $10x$ – be an increase of rent. So new rent will be $r = 420 + 10x$,

and number of occupied units: $n = 120 - x$.

Hence, the revenue

$$R = r * n = (420 + 10x)(120 - x) = -10x^2 + 780x + 50400$$

or $$R = -10(x - 39)^2 + 65610.$$

As we can see revenue R has maximum $R = 65619$ when $x = 39$.

Therefore the manager should charge $810 per month to maximize revenue.