

Answer on Question #37385 – Math - Calculus

Let n be a number of \$3 in rent (up or down) and R be a manager's revenue.

For increase in rent:

$$R = (120 - n)(396 + 3n)$$

$$R = -3n^2 - 36n + 47520$$

$$\frac{R}{3} = -n^2 - 12n + 15840$$

and, decrease in rent:

$$R = (120 + n)(396 - 3n)$$

$$R = -3n^2 + 36n + 47520$$

$$\frac{R}{3} = -n^2 + 12n + 15840$$

For rent increase,

$$\left(\frac{R}{3}\right)' = -2n - 12 = 0$$

$$2n = -12$$

$$n_{max} = -6$$

$$\frac{R}{3} = -(-6)^2 - 12 \cdot (-6) + 15840$$

$$\frac{R}{3} = 15876$$

For rent decrease,

$$\left(\frac{R}{3}\right)' = -2n + 12 = 0$$

$$2n = 12$$

$$n_{max} = 6$$

$$\frac{R}{3} = -6^2 + 12 \cdot 6 + 15840$$

$$\frac{R}{3} = 15876$$

Answer: the manager should either increase the rent by $6 \cdot 3 = 18$ dollars, or he should decrease the rent by 18 dollars, either a rent of $396 + 18 = 414$ dollars or $396 - 18 = 378$ dollars will maximize revenue.