Sujet n°16

FUNCTIONS

Please do not write on the subject paper and don't forget to give back the examination paper at the end of the test.

A baseball team plays in a stadium that hold 55,000 spectators. With a ticket price at £10, the average attendance had been 27,000 spectators.

A market survey showed that for each £0.10 decrease in the ticket prices, the attendance will increase by 300 spectators.

We want to maximise the revenue.

We label n the number of times the price is reduced by £0.10

1) Let's label p the price of one ticket after n reductions. Express $p(n)$ in terms of n.

2) Let's label q the quantity of sold tickets. Express $q(n)$ in terms of n.

3) Let's label r the revenue function. Check that $r(n)$ can be written as a quadratic function

$$r(n) = -30\,n^2 + 300\,n + 270{,}000$$

4) Work out the value of n that maximises the revenue, what is this maximum revenue ? What will be the optimum price and attendance ?