

Advanced Techniques

6.1 – Maximizing With a Reduction

When dealing with price reductions, x will be used for the number of price reductions. Quantity will be defined by the context of the problem.

$x = \text{number of price reductions}$

$p(x) = (\text{original price}) - (\$ \text{ per reduction})x$

$q(x) = (\text{original qty}) + (\text{add'n sold})x$

$R(x) = p(x) \cdot q(x)$

$C(x) = (\text{Unit cost})q(x) + (\text{fixed cost})$

$P(x) = R(x) - C(x)$

A computer manufacturer can sell 1500 personal computers per month at a price of \$3000 each. The manufacturer estimates that for each \$200 price reduction he will sell 300 more each month. If x stands for *the number of \$200 price reductions*, express the price p and the quantity q as functions of x .

$x =$

Price of each Computer: $p(x) =$

Total Quantity Sold: $q(x) =$

Ex A: Maximizing a Company's Profit

A store can sell 20 bicycles per week at a price of \$400 each. The manager estimates that for each \$10 price reduction she can sell two more bicycles per week. The bicycles cost the store \$200 each.

Find the price of the bicycles that maximize profit.

Find the quantity of the bicycles that maximize profit.

Also find the maximum profit.

Sentence Answer

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Ex B: Maximizing Harvest Size

An orange grower finds that if he plants 80 orange trees per acre, each tree will yield 60 bushels of oranges. He estimates that for each additional tree that he plants per acre, the yield of each tree will decrease by 2 bushels. How many trees should he plant per acre to maximize his harvest?

Pro Tips

#1) Define x

Define tree per
acre function
 $T(x)$

Define yield per
tree function
 $Y(x)$

Derive total yield
per acre function
 $TY(x)$

#2) To maximize
the yield, set the
 $TY'(x) = 0$ and
solve.

Make sure it is a
max by using the
second derivative
test.

#3) Use x to
answer the
question asked.

Sentence answer