Minimizing Inventory Costs

Example:

A retail appliance store sells **2500** TV sets per year. It costs **$10** to store one set for a year. To reorder, there is a fixed cost of **$20** to cover administrative costs per order, plus **$9** shipping fee for each set ordered.

a. How many times per year should the store reorder to minimize inventory costs?

Solution:

Let x = number of items per order

Yearly carrying cost = (yearly storage cost per item)•(average number of items carried)

$= 10 \bullet \frac{x}{2} = 5x$

Yearly reordering cost = (cost of each order)•(number of orders placed per year)

$= (20 + 9x) \bullet \frac{2500}{x} = \frac{50000}{x} + 22500$

Total Inventory Cost (y) = (yearly carrying cost) + (yearly reordering cost)

$y = (5x) + \left(\frac{50000}{x} + 22500 \right)$

$y' = 5 - \frac{50000}{x^2}$

$y' = 0$ when $5 = \frac{50000}{x^2}$

$x^2 = 10000$

$x = 100$

$y'' = \frac{50000}{x^3} > 0$ when x = 100, so the minimum number of orders placed per year = $\frac{2500}{100} = 25$ orders.

b. How many sets should be ordered each time?

Solution:

x = 100, so each order should contain 100 TV sets.

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