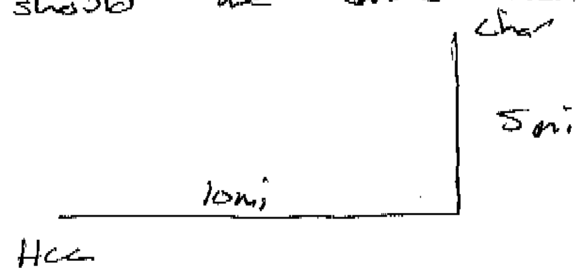
10.4: Apps

Ex1: A ball thrown into the air from a building 100 ft high travels along a path described by $y = \frac{-x^2}{110} + x + 100$ where y is its height & x the horizontal distance from the building. What is the max height the ball will reach?

Ex2: A field w/ 1 side along a river is to be fenced. No fence is needed ~~opposite~~ along the river. Fence opposite the river costs \$20/ft. Fence on other sides costs \$5/ft. Find the min cost to fence 45,000 ft^2.

Ex3: A new piece of cardboard is to be used to form a box by cutting squares from the corner. If the orig. piece is 24 x 36cm, find the max volume. (No top).

Ex4: Dusty wants to get hm to Char as quickly as possible. His CAT dumptruck can do 30mph on the road & 20mph off-road. What route should he take home?



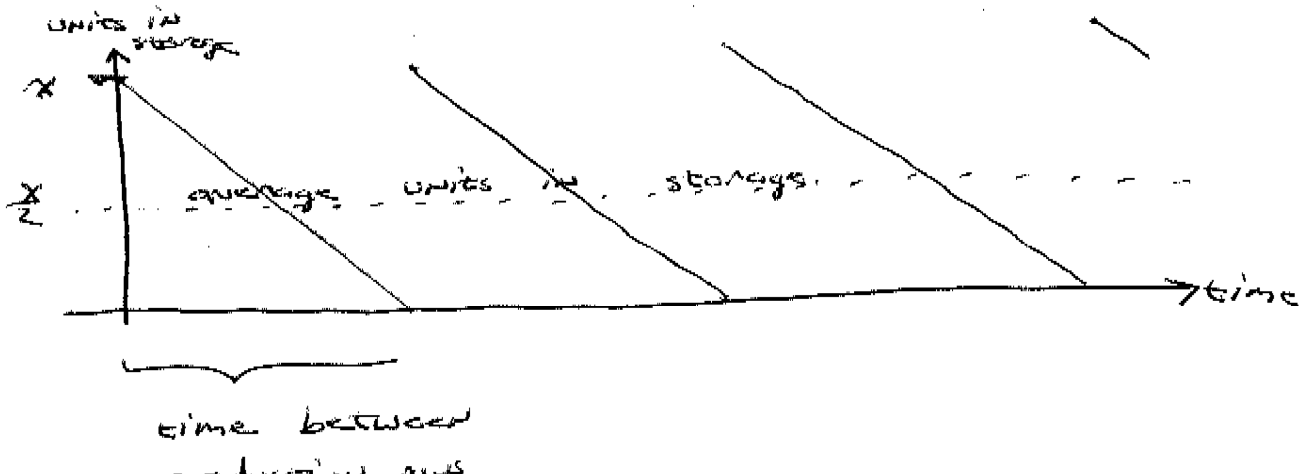
Inventory cost Models.

It costs companies to have inventory on the shelf. why? So, we produce in production runs.

Our goal is to minimize the total cost of producing and storing inventory.

$$\text{cost } C = \begin{pmatrix}\text{No. of}\\ \text{items}\end{pmatrix}\begin{pmatrix}\text{cost/}\\ \text{item}\end{pmatrix} + \begin{pmatrix}\text{No. of}\\ \text{runs}\end{pmatrix}\begin{pmatrix}\text{cost/}\\ \text{run}\end{pmatrix} + \begin{pmatrix}\text{ave. no.}\\ \text{stored}\end{pmatrix}\begin{pmatrix}\text{storage}\\ \text{cost/item}\end{pmatrix}$$

If we assume that x items are produced each run & then they are removed from the shelves at a fixed rate...



example

A company needs 450,000 items/yr. Each production run costs \$500 to set-up and \$10/item produced. Inventory costs are \$2/yr. Find the number of items that should be produced in each run so that the total cost of production & storage is minimized.