MM-01 Optimal Coke Can Problem

An aluminum can is to contain 54 in^3 of cola. What are the dimensions of such a can using the least amount of aluminum?

MM-02 **Open Top Box Problem**

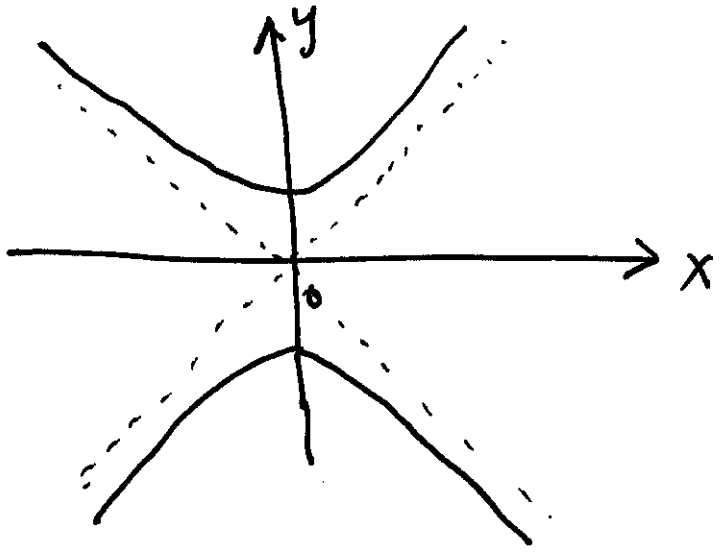
Find the volume of the largest box with square base and open top if only 1200 cm^2 of cardboard is used.

MM-03 **Poster Problem**

The top and bottom margins of a rectangular poster are 1" and side Margins are 2". If the area of the printed matter is fixed at 32 in^2, find smallest possible area of the entire poster.

MM-04 **Distance: Point to Curve Problem**

Find the point on the hyperbola $y^2 - x^2 = 4$ closest to the point $(2,0)$:

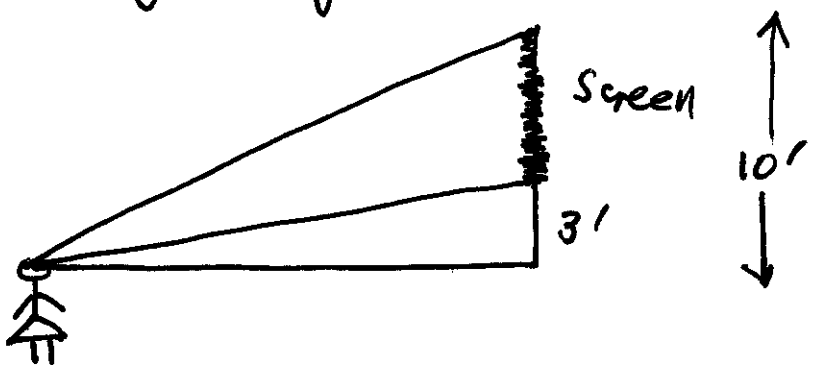


MM-05 **Inscribed Cylinder Problem**

Find the volume of the largest cylinder that can be inscribed inside a cone of radius 3' and height 8'.

MM-06 **Best Viewing Angle Problem**

An auditorium with flat floor has a large screen on one wall. The lower edge of the screen is 3' above eye level, the upper edge 10' above eye level. How far from screen should you stand to maximize viewing angle:

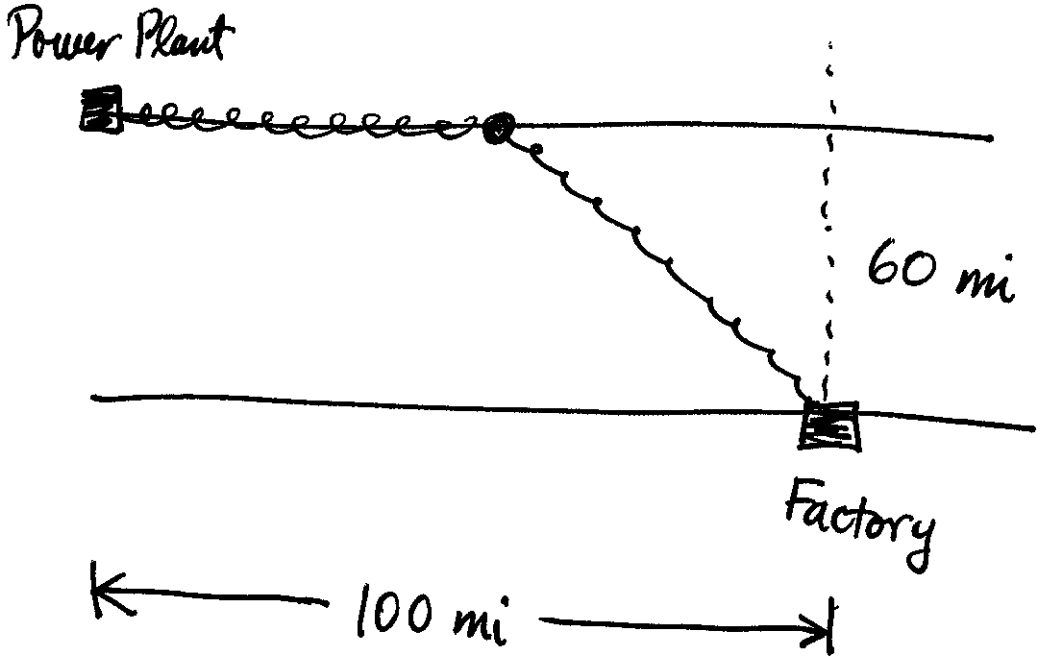


MM-07 **Shortest Beam Problem**

Find the length of the shortest beam that will reach the side of a building if there is an 8' fence 3' away from building.

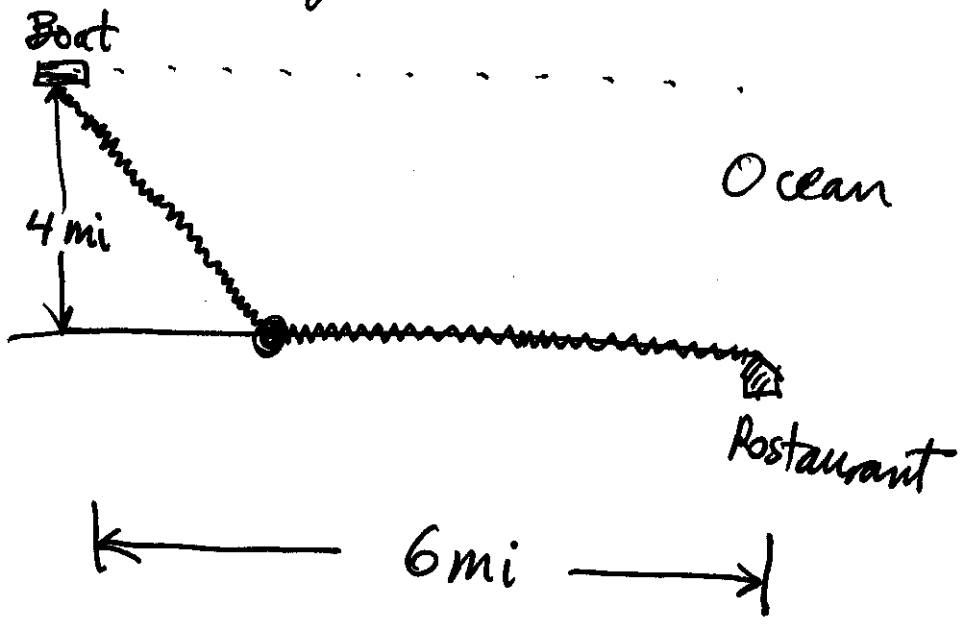
MM-08 Laying Cable Problem

A factory is located 100 mi downstream on the opposite side of a 60 mi wide river from a power plant. If it costs $1.3 million/mi to lay cable under water and $0.50 million/mi along the bank, find the cheapest route.



MM-09 Boating/Walking Problem

A boat on the ocean is 4 mi from the nearest point on a straight shoreline and that point is 6 mi from a restaurant on the shore. A man rows the boat straight to a point on the shore and then walks along the shore to the restaurant. If he walks at 3 mph and rows at 2 mph, what is his quickest travel time?



MM-10 **Inscribed Rectangle Problem**

Find the area of the largest rectangle that can be inscribed in the region $y = 8 - x^2$, $y \geq 0$.

MM-11 Missing The Train Problem

A man stands in a field near railroad tracks just as the locomotive passes the point nearest him, $\frac{1}{4}$ mile away. Train has length $\frac{1}{3}$ mi and is moving at 20 mph. If he starts running across field in a straight line, how slowly can he run and still catch the train?