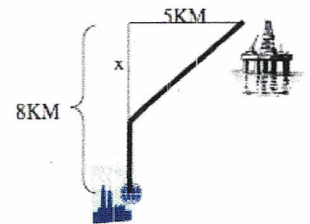


- The product of two positive numbers is 363. Minimize the sum of the first and three times the second. (answer: 33 and 11)
- The management of a large store wishes to add a fenced-in rectangular storage yard of 20,000 sq. ft., using the building as one side of the yard. Find the minimum amount of fencing that must be used to enclose the remaining 3 sides of the yard. (answer: 400')
- A farmer has 80 feet of fencing to enclose three sides of a rectangular plot of land (the fourth side has an existing stone partition). What dimensions for the rectangular plot will enclose the maximum area? (answer: 20'x40')
- An open box is to be made from a rectangular piece of material by cutting equal squares from each corner and turning up the sides. Find the dimensions of the box of maximum volume if the material has dimensions 6 inches by 6 inches. (answer: 4" x 4" x 1")



- An open box is to be made from a 16" by 30" piece of cardboard by cutting out squares of equal size from the four corners and bending up the sides. What size should the squares be to obtain a box with largest possible volume? (Answer: 10/3")

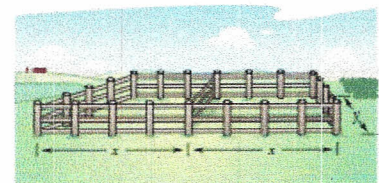
- An offshore oil well is located in the ocean at point W, which is 5 miles from the closest shorepoint A on a straight shoreline. The oil is to be piped to a shorepoint B that is 8 miles from A by piping it on a straight line under water from W to some shorepoint P between A and B and then on to B via a pipe along the shoreline. If the cost of laying the pipe is \$100,000 per mile under water and \$75,000 per mile over land, where should the point P be located to minimize the cost of laying the pipe? (Answer: approx 5.67 miles from A)



- The sum of the first number and twice the second number is 108 and the product is a maximum. Find two positive numbers that satisfy this requirement. (Answer: 27 and 54)
- Find the point on the graph of the function that is closest to the given point:

$$f(x) = x^2, \quad \left(2, \frac{1}{2}\right) \quad (\text{Answer: } (1,1))$$

- A rancher has 400' of fencing with which to enclose two adjacent rectangular corrals. What dimensions should be used so that the enclosed area will be a maximum? (Answer: 50' x 200/3')



- A Norman window is constructed by adjoining a semicircle on the top of an ordinary rectangular window. Find the dimensions of the Norman window of maximum area if the total perimeter is 16 feet. (Answer: $\frac{32}{4+\pi}$ ' x $\frac{16}{4+\pi}$ ')

