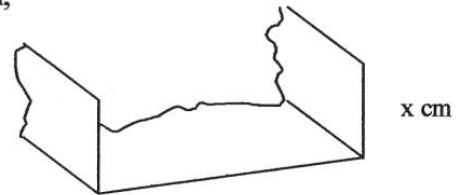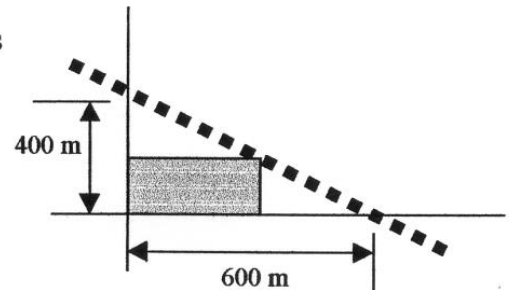1.   The Sum of two natural numbers is 12. If their product is a maximum, find the numbers.

2.   The sum of a number and three times another is 18. Find the number if their product is a maximum.

3.   A rectangular lot is bordered on one side by a stream and on the other three sides by 600 m of fencing. Find the dimensions of the lot if its area is a maximum.

4.   A lifeguard marks off a rectangular swimming area at a beach with 200 m of rope. What is the greatest area of water she can enclose?

5.   A theatre seats 2000 people and charges $10 for a ticket. At this price, all the tickets can be sold. A survey indicates that if the ticket price is increased, the number sold will decrease by 100 for every dollar of increase. What ticket price would result in the greatest revenue?

6.   A trough is made from a rectangular strip of sheet metal, 50 cm wide, by bending up at right angles a strip, x cm wide, along two sides. For what value of x is the cross section area a maximum?

x cm

Challenge:

7.   A straight section of railroad track crosses two highways 400 m and 600 m from an intersection. Find the dimensions of the largest rectangular lot that can be laid out in the triangle formed by the railroad and the highways.

400 m

600 m

8.   A 30 cm piece of wire is cut in two. One piece is bent into the shape is bent into the shape of a square and the other is bent into the shape of a rectangle with a length-to-width ratio of 2:1. What are the lengths of the pieces if the sum of the areas of the square and the rectangle is a minimum?

Answers: 1. 6, -6   2. 9, 3   3. 150 m x 300 m   4. 5000 m^2 5. $15
             6. 12.5 cm   7. 300 m x 200 m   8. 14.1 cm, 15.9 cm