Lab 1

Exercise 1:

Find two positive numbers whose sum is 300 and whose product is a maximum.
Solution:

Y=300-x

P(X)= X(300-X) = 300X- X^2

Take the derivative of P(X) with respect to X and set it equal to 0.

P'(X)= 300 – 2X = 0
X = 150

the two positive numbers whose sum is 300 and whose product is a maximum are:

x = 150 and y = 300 - x = 150
So the two numbers are 150 and 150.

Exercise 2:

Let x and y be two positive numbers such that x+2y=50 and (x+1)(y+2) is a maximum.
Solution:

x = 50 - 2y

(x+1)(y+2) in terms of y

(x+1)(y+2) = (50-2y+1)(y+2) = (-2y^2 + 46y + 102)

take the derivative of this expression with respect to y and set it equal to 0.

(-4y + 46) = 0
y = 11.5

use the expression for x in terms of y to find x.

x = 50 - 2y = 27

the two positive numbers that satisfy the given conditions are:
x = 27 and y = 11.5

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