MA 213 Worksheet #13

Section 14.7-14.8
02/26/2019

1 *14.7.33* Find the absolute maximum and minimum values of $f(x,y) = x^2 + y^2 + x^2y + 4$ on the set $D = \{(x,y) \mid |x| \leq 1, |y| \leq 1\}$.

2 *14.7.45* Find three positive numbers whose sum is 100 and whose product is a maximum.

3 *14.7.53* A cardboard box without a lid is to have a volume of $32,000$ cm^3. Find the dimensions that minimize the amount of cardboard used.

4 *14.7.42* Find the point on the plane $x - 2y + 3z = 6$ that is closest to the point $(0,1,1)$. Note: The distance to a plane formula on page 830 in the textbook can be used to check your answer.

5 *14.7.55* If the length of the diagonal of a rectangular box must be L, what is the largest possible volume?

6 *14.8.3 & 5* Use Lagrange multipliers to find the absolute maximum and minimum values of the function subject to the given constraint.

$$(a)\ f(x,y) = x^2 - y^2, \quad x^2 + y^2 = 1 \qquad\qquad (b)\ f(x,y) = xy, \quad 4x^2 + y^2 = 8$$

7 *14.8.17* Find the extreme value of $f(x,y,z) = yz + xy$ subject to the constraints $xy = 1$ and $y^2 + z^2 = 1$.

8 *14.8.29* Use Lagrange multipliers to prove that the rectangle of maximum area that has a given perimeter p is a square.