MATH2010 Advanced Calculus I, 2020-21

HOMEWORK FOUR

Due 3pm Monday, Dec. 7

Q1. Find the radius and height of the open right circular cylinder of largest surface area that can be inscribed in a sphere of radius a. What is the largest surface area?

Q2. Find the largest product of the positive numbers x, y, and z can have if $x + y + z^2 = 16$.

Q3. (a) Find the maximum value of $w = xyz$ on the line of intersection of the two planes $x + y + z = 40$ and $x + y - z = 0$.

(b) Give a geometric argument to support your claim that you have found a maximum, and not a minimum, value of w.

Q4. Use Taylor's formula for $f(x, y)$ at the origin to find quadratic and cubic approximations of f near the origin.

(a) $f(x, y) = \ln(2x + y + 1)$.

(b) $f(x, y) = \frac{1}{1-x-y+xy}$.

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