Quiz 3

May 18 2004, Show all details.

1. Find the tangent plane and the normal line of $\frac{1}{x} + \frac{1}{y} + \frac{1}{z} = 1$ at $(x, y, z) = (2, 3, 6)$.
2. Write down the Taylor polynomial of x and y for $\sin(2x + y)$ around $(1, 1)$ up to including the second order term. You can simply write the error term as $O((?)^3)$, just specify the correct argument.
3. Find the absolute maxima and minima of $x^2 - xy + y^2$ on $[-1, 1] \times [-1, 1]$.
4. Write down the equation for maximizing/minimizing $x^2 + y^2 - z$ subject to $x + y + z = 0$ and $y^2 + z^2 = 1$ using the method of Lagrangian multipliers. Indicate number of equations and number of unknowns. DO NOT SOLVE IT.
5. Find the corresponding upper and lower limits of integration for $\int\int\int dx dy dz$ which corresponds to the volume of the tetrahedron in the first octant bounded by the coordinate planes and $x/3 + y/2 + z = 1$. Find the value of the integral.

Calculus II, Spring 2004

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