# Calculus II

## Assignment 4

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Name : ______________________

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1. Find an equation of the tangent plane to the given surface at the specified point.
   (a) $z = 3y^2 - 2x^2 + x; \quad (2, -1, -3)$
   (b) $z = xe^{xy}; \quad (2, 0, 2)$
   Hint : Equation 2 in Section 15.4.
2. Explain why the function is differentiable at the given point. Then find the linearization $L(x, y)$ of the function at that point.
   $f(x, y) = x^3y^4; \quad (1, 1)$
   Hint : Theorem 8 in Section 15.4.
3. Verify the linear approximation at $(0, 0)$.
   $\frac{2x+3}{4y+1} \approx 3 + 2x - 12y$
   Hint : Theorem 8 in Section 15.4.
4. Find the total differential of the function.
   $z = e^{-2x} \cos 2\pi t$
5. Use the Chain Rule to find $dz/dt$.
   (a) $z = x^2 + y^2 + xy; \quad x = sint,\ y = e^t$
   (b) $z = \cos(x + 4y); \quad x = 5t^4,\ y = 1/t$
6. Use the Chain Rule to find the indicated partial derivatives.
   $z = x^4 + x^2y; \quad x = s + 2t - u,\ y = stu^2;$
   $\frac{\partial z}{\partial s}, \frac{\partial z}{\partial t}, \frac{\partial z}{\partial u}$, when $s = 4, t = 2, u = 1$

Reading materials : Textbook Section 15.4, 15.5.