Name: SOLUTIONS

241S1 Quiz #4 - October 6, 2015, 10 a.m.

1. Use implicit differentiation to find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial t}$ when $x^2 + 2y^2 + 3z^2 = 1$.

$$2x + 0 + 6z\frac{dz}{dx} = 0$$

$$0 + 4y + 6z\frac{dz}{dy} = 0$$

$$\boxed{\frac{dz}{dx} = \frac{-2x}{6z} \qquad \frac{dz}{dy} = \frac{-4y}{6z}}$$

2. State Clairaut's theorem.

See exam #1 solutions

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241S1 Quiz #4 - October 6, 2015, 10 a.m.

1. Use implicit differentiation to find $\frac{\partial z}{\partial x}$ and $\frac{\partial z}{\partial t}$ when $x^2 + 2y^2 + 3z^2 = 1$.

2. State Clairaut's theorem.

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241S3 Quiz #4 - October 8, 2015, 10 a.m.

1. If $z = f(x, y) = x^2 + 3xy - y^2$ find the differential dz.

$f_x = 2x + 3y$

$f_y = 3x - 2y$

$$\boxed{dz = (2x+3y)\,dx + (3x-2y)\,dz}$$

2. Let $f(x, y) = x^2 e^y$. Find the linearization of $f(x, y)$ at the point .(1, 0)

$f(1,0) = 1$

$f_x = 2xe^y$ $\quad f_y = x^2 e^y$ $\quad f_x(1,0) = 2$

$f_y(1,0) = 1$

$$\boxed{\begin{gathered} z - 1 = 2(x-1) + 1(y) \\ \text{or} \\ 2x + y - z = 1 \end{gathered}}$$

Name:

241S3 Quiz #4 - October 8, 2015, 10 a.m.

1. If $z = f(x, y) = x^2 + 3xy - y^2$ find the differential dz.

2. Let $f(x, y) = x^2 e^y$. Find the linearization of $f(x, y)$ at the point .(1, 0)

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241S2 Quiz #4 - October 8, 2015, 11 a.m.

1. Find the equation of the tangent plane to the graph of $z = 3x^2 + 2y$ at the point$(1, 1, 5)$.

$f_x = 6x \quad f_y = 2 \quad f_x(1,1) = 6 \quad f_y(1,1) = 2 \quad f(1,1) = 5$

$$\boxed{\begin{gathered} z - 5 = 6(x-1) + 2(y-1) \\ \text{or} \\ 6x + 2y - z = 3 \end{gathered}}$$

2. Find the intersection of this tangent plane with the line $\vec{r}(t) = (t, t+1, 2t+2)$.

$6t + 2(t+1) - (2t+2) = 3$

$6t = 3 \quad t = 1/2$

$(1/2, 3/2, 3)$

Name:

241S2 Quiz #4 - October 8, 2015, 11 a.m.

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2. Find the intersection of this tangent plane with the line $\vec{r}(t) = (t, t+1, 2t+2)$.