Name_____ ID_____

MATH 251   Quiz 3   Fall 2006 | 1-5 | /25 |

Sections 507   P. Yasskin

Multiple Choice: (5 points each)

1. For the function $f(x,y) = y^2 \cos(xy)$ which partial derivative is incorrect?

   a. $\dfrac{\partial f}{\partial x} = -y^3 \sin(xy)$

   b. $\dfrac{\partial f}{\partial y} = 2y\cos(xy) - xy^2 \sin(xy)$

   c. $\dfrac{\partial^2 f}{\partial x^2} = -y^4 \cos(xy)$

   d. $\dfrac{\partial^2 f}{\partial y \partial x} = -3y^2 \sin(xy) - xy^3 \cos(xy)$

   e. $\dfrac{\partial^2 f}{\partial x \partial y} = -y^2 \sin(xy) - xy^3 \cos(xy)$

2. Find the equation of the plane tangent to $z = x^2 y^3$ at the point $(2,1,4)$.
Its z-intercept is:

   a. 0

   b. -24

   c. -16

   d. 24

   e. 4

3. Consider a function $p(x, y)$. If $p(2,3) = 3$, $\dfrac{\partial p}{\partial x}(2,3) = 4$, and $\dfrac{\partial p}{\partial y}(2,3) = 5$, estimate $p(2.1, 2.8)$.

   a. 2.4

   b. 2.6

   c. 2.8

   d. 3.2

   e. 3.4

4. If the temperature in a room is given by $T = 75 + xyz$ and a fly is located at $(2,1,4)$, in what unit vector direction should the fly fly in order to decrease the temperature as fast as possible?

   a. $\dfrac{1}{\sqrt{21}}\langle 2,4,1\rangle$

   b. $\dfrac{1}{\sqrt{21}}\langle -2,-4,-1\rangle$

   c. $\langle 4,8,2\rangle$

   d. $\langle -4,-8,-2\rangle$

   e. $\dfrac{1}{\sqrt{21}}\langle 2,-4,1\rangle$

5. Find the equation of the plane tangent to the surface $x^2z^2 + xy^3 = 31$ at the point $(1,3,2)$. Its z-intercept is:

   a. -31

   b. 124

   c. 120

   d. 31

   e. 4