

EXAM 2(In Class)
Math 232
March 19, 2007

Name _____

1. Find the horizontal range and the speed at impact of an object which is launched at an initial speed of 120 feet per second, 5 feet above the ground, at an angle of $\frac{\pi}{6}$ radians above the horizontal. (Assume the only force acting on the object is gravity.) (6 pts)

2. Show that $\lim_{(x,y) \rightarrow (0,0)} \frac{y \sin(x)}{x^2 + y^2}$ does not exist. (7 pts)

3. Determine all the points at which $f(x, y) = \ln(3 - x^2 + y)$ is continuous. (6 pts)

4. Find the linear approximation of $f(x, y) = xe^{xy^2} + 3y^2$ at the point $(2, 0)$. (6 pts)

5. Find each of the following. (5 pts each)

(a) f_x if $f(x, y) = 3x^4y + 8x^{0.5}y^2 - 3x^2$

(b) $\frac{\partial}{\partial h} \left(\frac{13}{2a}(2a + b)h \right)$

(c) $\frac{\partial^2 z}{\partial y \partial x}$ if $z = e^{x+2y} \sin y$.

(d) $f_x(\pi/3, 1)$ if $f(x, y) = x \ln(y \cos(x))$

6. Find both $\frac{\partial f}{\partial u}$ and $\frac{\partial f}{\partial v}$ for the following function $z = \tan^{-1}\left(\frac{x}{y}\right)$ with $x = u^2 + v^2$ and $y = u^2 - v^2$. (8 pts)

7. Find the directional derivative of $f(x, y) = x^2 \sin(4y)$ at the point $\left(-2, \frac{\pi}{8}\right)$ in the direction $\vec{u} = \langle 2, -1 \rangle$. (7 pts)