MATH 2130 Test 1 October 10, 2012 60 minutes

10 **1.** Show that the lines

$$\begin{aligned} x &= 1+t, \\ y &= 2+3t, \\ z &= 4-2t; \end{aligned} \qquad \text{and} \qquad \begin{aligned} y &= 3x, \\ 2x+z &= 9 \end{aligned}$$

determine a plane, and find its equation simplified as much as possible.

6 **2.** Find the distance between the line $x = 3+2t$, $y = -1+t$, $z = 5+4t$ and the plane $6x-8y-z = 7$.

5 **3.** Find a vector of length 3 tangent to the curve

$$x = t^3 + t, \quad y = 2t - t^2, \quad z = t + 1,$$

at the point $(2, 1, 2)$.

8 **4.** Find parametric equations for the curve

$$z = 4x^2 + y^2, \quad 8x + 4y + z = 8,$$

directed clockwise as viewed from a point far up the z-axis.

6 **5.** Show that the following limit does not exist,

$$\lim_{(x,y)\to(0,0)} \frac{xy^3}{x^2+y^6}.$$

5 **6.** Show that the function $f(x, y) = x^2 + y^2 e^{y/x}$ satisfies the equation

$$x\frac{\partial f}{\partial x} + y\frac{\partial f}{\partial y} = 2f(x, y).$$