MATH 2130 Test 1 2010 Fall

9 **1.** (a) Show that the lines

$$\frac{x-2}{3} = \frac{y+4}{6} = \frac{2z-1}{5} \qquad \text{and} \qquad x+2y+3z = 33, \quad x-y+z = 6$$

are not parallel.

(b) Assuming that the lines intersect at some point, find the equation of the plane containing the lines. Simplify your equation as much as possible.

8 **2.** Find the distance between the lines $x = 2+t$, $y = -1+t$, $z = 3-2t$ and $2x-2y+3z = 8$, $x+y-z = 2$.

9 **3.** (a) Find parametric equations for the curve

$$x^2 + 4y^2 = 16, \quad y+z = 2.$$

Assume that the curve is directed counterclockwise as viewed from the origin.

(b) Find a unit tangent vector to the curve in part (a) at the point $(0,2,0)$.

(c) Set up, but do **NOT** evaluate, a definite integral for the length of the curve in part (a).

9 **4.** Determine whether the following limit exists,

$$\lim_{(x,y)\to(0,0)} \frac{x^4 - x^2y + 2y^4}{2x^4 - 5x^2y + 4y^4}.$$

If the limit does not exist, explain why not.

5 **5.** Find all points where the curve $y^2 = z^2+1$, $z = x^2$ intersects the surface $x^2+y^2+z^2 = 2$.