

Name: Curlee

Section: 2 or 4 (circle one)

P Q

1. Give the parametric equations of the line passing through the points $(0, 3, 4)$ and $(3, 2, 0)$.

$$\vec{PQ} = \langle 3-0, 2-3, 0-4 \rangle = \langle 3, -1, -4 \rangle.$$

Using point P: $x = 0 + 3t$, $y = 3 - t$, $z = 4 - 4t$

2. Find the equation of the plane containing the points $(1, 0, 1)$, $(1, 2, 0)$ and $(0, 2, 1)$.

$$\vec{PQ} = \langle 1-1, 2-0, 0-1 \rangle = \langle 0, 2, -1 \rangle$$

$$\vec{PR} = \langle 0-1, 2-0, 1-1 \rangle = \langle -1, 2, 0 \rangle$$

$$\vec{PQ} \times \vec{PR} = \begin{vmatrix} i & j & k \\ 0 & 2 & -1 \\ -1 & 2 & 0 \end{vmatrix}$$

So, ^{an} the equation of the plane is $2(x-1) + (y-0) + 2(z-1) = 0$

3. Determine the point of intersection between the line from problem 1 and the plane from problem 2.

$$2(3t-1) + (3-t) + 2(4-4t) = 0 \quad \text{so, } x = 3\left(\frac{7}{3}\right) = 7$$

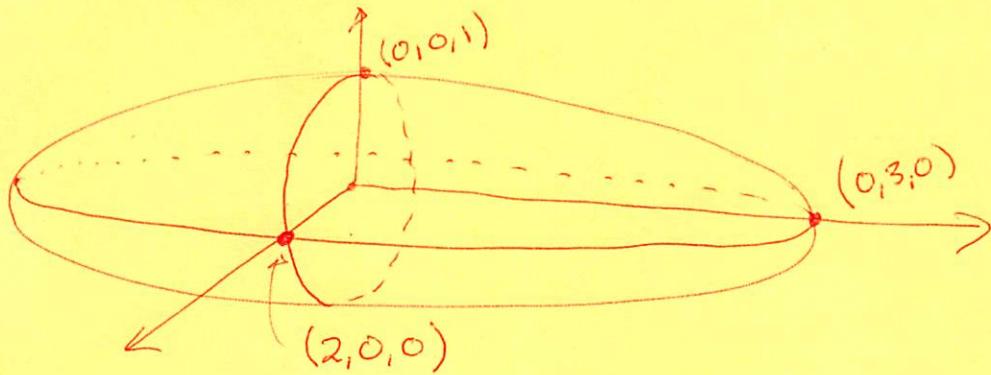
$$6t - 6t - 8t = 2 - 3 - 8$$

$$t = \frac{7}{3}$$

$$y = 3 - \frac{7}{3} = \frac{2}{3}$$

$$z = 4 - 4\left(\frac{7}{3}\right) = -\frac{16}{3}$$

4. Sketch a graph of the ellipsoid $\frac{x^2}{4} + \frac{y^2}{9} + z^2 = 1$.



5. Sketch a graph of the hyperbolic paraboloid $z^2 - y^2 = x$.

Note: Section 4, did I draw the wrong picture in class? It's giving me nightmares!

