1= Sean C = $6\bar{i} + 3j$ y D= $5j + 4j - 3k$ dos vectores en tres dimenciones, calcule la proyeccion escalar sobre de D sobre C, la proyeccion vectorial y el angulo entre ellos

$C = 6\bar{i} + 3\bar{j} = \langle 6, 3, 0 \rangle$

$D = 5i + 4j - 3k = \langle 5, 4, -3 \rangle$

$D \cdot C = \langle 5 + 4 - 3 \rangle \cdot \langle 6 + 3 + 0 \rangle$

$D \cdot C = 30 + 12 + 0 = 42$

$|C| = \sqrt{(6^2) + (3)^2 + (0)^2}$

$|C| = \sqrt{45}$

$|P_{D/C}| = \frac{42}{\sqrt{45}} = \underline{6.2609}$

$\overrightarrow{P}_{D/C} = \frac{D \cdot C}{|C|^2} \cdot \overrightarrow{C}$

$\overrightarrow{P}_{D/C} = \frac{42}{45} \cdot \langle 6 + 3 + 0 \rangle = \langle \frac{252}{45}, \frac{126}{45}, 0 \rangle$

Problema 1

$$\cos\theta = \frac{D \cdot C}{|D| \cdot |C|}$$

$$\cos\theta = \frac{42}{\sqrt{50} \cdot \sqrt{45}}$$

$$|D| = \sqrt{5^2 + 4^2 + 3^2}$$

$$|D| = \sqrt{50}$$

$$\cos\theta = \frac{42}{47.4341}$$

$$\theta = \cos^{-1}\left(\frac{42}{47.4341}\right)$$

$$\theta = 27.6945°$$

Problema 2

2= Calcule el volumen del paralelepipedo con aristas adyasentes PQ, PR, PS
P(3, 0, 1), Q(-1, 2, 5), R(5, 1, -1) y S(0, 4, 2)

$PQ = (-1-3), (2-0), (5-1) = \langle -4, 2, 4 \rangle$

$PR = (5-3), (1-0), (-1-1) = \langle 2, 1, -2 \rangle$

$PS = (0-3), (4-0), (2-1) = \langle -3, 4, 1 \rangle$

$V = |(PR \times PS) \cdot PQ|$

$$PR \times PS \begin{vmatrix} i & j & k \\ 2 & 1 & -2 \\ -3 & 4 & 1 \end{vmatrix}$$

$[(1)(1) - (4)(-2)]\, i - [(2)(1) - (-3)(-2)]\, k$

$= 9i + 4j + 11k$

$= \langle 9, 4, 11 \rangle \langle -4, 2, 4 \rangle$

$(9)(-4) + (4)(2) + (11)(4)$

$-36 + 18 + 44 = 16u^3$

$-36 + 8 + 44 = 16u^3$

Problema 3

Dado el vector de posicion de una particula en movimiento grafique una porcion de la curva y el vector tangente en el valor indicado de t.

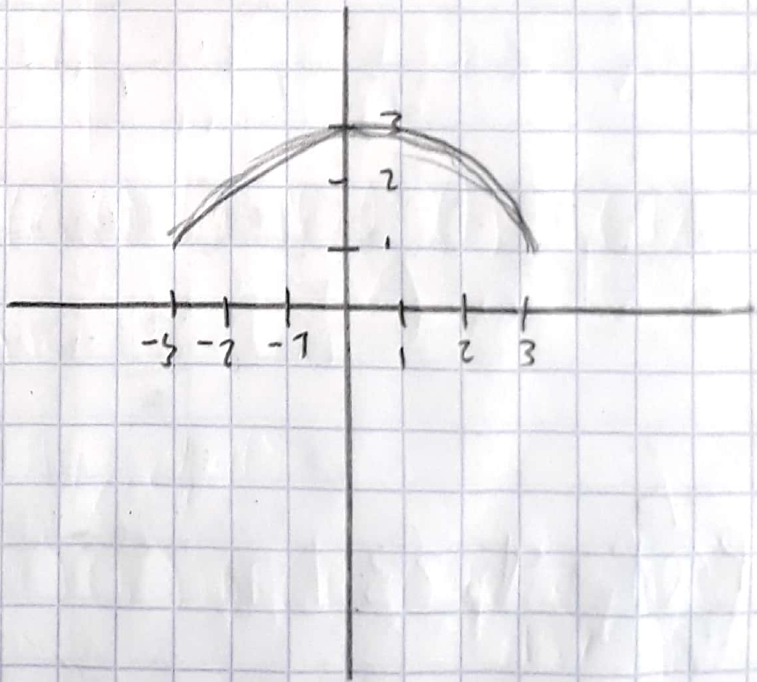
$r(t) = (\cos 3t)i + (\sen 3t)j \quad t = \pi/3$)

$r'(\pi/3) = <-3 \sen(-\pi/3), 3\cos(\pi/3) = <2.59, 1.5>$

$r'(\pi/6 = <-3 \sen(-\pi/6), 3\cos(-\pi/6 > = <1.5, 2.59>$

$r'(0) = <-3 \sen(0), 3\cos(0)> = <0.00, 3>$

t	$r(t)$
$+\pi/3$	$<2.59, 1.5>$
$-\pi/6$	$<1.5, 2.59>$
0	$<0, 3>$
$\pi/3$	$<2.59, 1.5>$



Problema 4

Calcular la distancia de la recta $r(t)=(t+7)i+(t-2)+(\frac{3t}{4}-6)k$ al origen

$Q=(0,0,0)$

$v=\langle 1, 1, 3/4 \rangle$

$P_0=(t+7, t-2, \frac{3t}{4}-6)$

$\vec{PQ}=\langle 0-(t+7), 0-(t-2), 0-(\frac{3t}{4}-6) \rangle$

$\vec{PQ}=0-t-7, 0-t+2, 0-\frac{3t}{4}+6 \rangle$

$\vec{PQ}=\langle -7-t, -t+2, -\frac{3t}{4}+6 \rangle$

$PQ \cdot v=0$

$[(1)(-t-7)]+[(1)(-t+2)]+[(3/4)(-\frac{3t}{4}+6)]=0$

$-t-7-t+2-\frac{9t}{16}+\frac{18}{4}=0$

$-2t-\frac{9t}{16}-5+\frac{18}{4}=0$

$\frac{-2t}{1}-\frac{9t}{16}=\frac{-32t-9t}{16}=\frac{-41t}{16}$ $\quad \frac{-5}{1}+\frac{18}{4}=\frac{-20+18}{4}=\frac{-2}{4}$

$-\frac{41t}{16}-\frac{2}{4}=0$ $\quad t=\frac{16\cdot(\frac{2}{4})}{-41}=\frac{8}{-41}=-0.1951$

Problema 4

$$\vec{PQ} = \langle -7-t, -t+2, \frac{3t}{4}+6 \rangle$$

$$\vec{PQ} = \langle -7-\left(-\frac{8}{41}\right), -\left(-\frac{8}{41}\right)+2, \frac{3\left(-\frac{8}{41}\right)}{4}+6 \rangle$$

$$\vec{PQ} = \langle -7+\frac{8}{41}, +\frac{8}{41}+2, \frac{\frac{-24}{41}}{4}+6 \rangle$$

$$\vec{PQ} = \langle -\frac{279}{41}, \frac{90}{41}, \frac{-24}{164}+6 \rangle$$

$$\vec{PQ} = \langle -\frac{279}{41}, \frac{90}{41}, +\frac{240}{41} \rangle$$

$$|\vec{PQ}| = \sqrt{\left(-\frac{279}{41}\right)^2+\left(\frac{90}{41}\right)^2+\left(\frac{240}{41}\right)^2}$$

$$|\vec{PQ}| = 9.2347$$

Escaneado con CamScanner

6 = Determine la ecuacion del plano que contiene los puntos. $P(1,0,-1)$, $Q(2,4,5)$ y $R(3,1,7)$

$PQ = (2-1),(4-0),(5+1) = \langle 1,4,6 \rangle$

$PR = (3-1),(1-0),(7+1) = \langle 2,1,8 \rangle$

$$N = \begin{array}{c} \begin{matrix} i & j & k \end{matrix} \\ \begin{vmatrix} 1 & 4 & 6 \\ 2 & 1 & 8 \end{vmatrix} \end{array}$$

$$PQ \times PR = \begin{vmatrix} 4 & 6 \\ 1 & 8 \end{vmatrix} i - \begin{vmatrix} 1 & 6 \\ 2 & 8 \end{vmatrix} j + \begin{vmatrix} 1 & 4 \\ 2 & 1 \end{vmatrix} k$$

$N = [32-6]i - [8-12]j + [1-8]k$

$\vec{N} = 26i + 4j - 7k$

$\vec{PT} = (x, y, z) - (1, 0, -1)$

$= \langle x-1, y-0, z+1 \rangle$

$PT \cdot n = \langle x-1, y-0, z+1 \rangle \langle 26, 4 -7 \rangle = 0$

$= (x-1)(26) + (y-0)(4) + (z\ 1)(-7) = 0$

$26x - 26 + 4y - 7z - 7 = 0$

$26x + 4y - 7z = 26 + 7$

$26x + 4y - 7z = 33$

$\underline{26x + 4y - 7z = 33}$