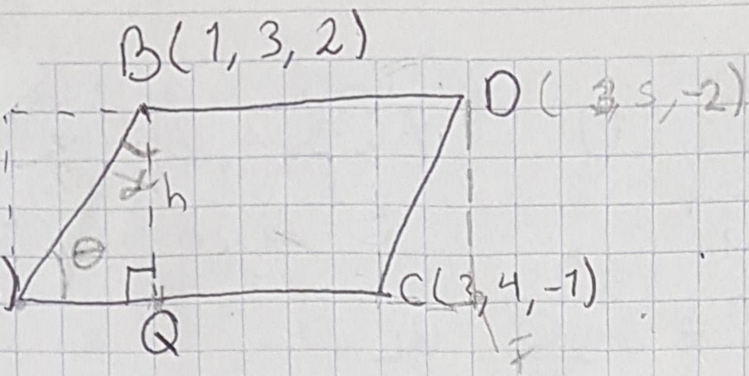
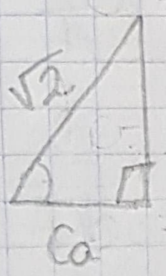
1



Calcular

a) La distancia entre los puntos A y Q

$\overrightarrow{AB} = (1, 3, 2) - (1, 2, 3) = (0, 1, -1)$



$\frac{\sqrt{2}}{2}$

$\cos 30° = \frac{C.a}{hip}$

$Ca = \cos 30° \; hip$

$Ca = \frac{\sqrt{6}}{2}$

distancia A y Q es

$\frac{\sqrt{6}}{2} \; u_L$

$\overline{AC} = (2, 2, -4)$

$\overline{BD} = (2, 2, -4)$

$\overline{AB} = (0, 1, -1)$

$|\overline{AC}| = 2\sqrt{6}$

$|\overline{AB}| = \sqrt{2}$

$\operatorname{sen} \theta = \frac{h}{|\overline{AB}|}$

$\theta = 30°$

$\alpha = 60°$

b) h $\overline{AB} = (0, 1, -1)$ $\overline{AC} = (2, 2, -4)$

$|\overline{AC}| = \sqrt{24} = 2\sqrt{6}$ $\theta = \arg\cos 30^\circ$

$h = \sqrt{2}\left(-\frac{1}{2}\right) = \frac{\sqrt{2}}{2}$ u_L

c) $Area = |\overline{AB} \times \overline{AC}|$

$|\overline{AB} \times \overline{AC}| = \sqrt{(-2)^2 + (2)^2 + (2)^2} = 2\sqrt{3}$

$\overline{AB} \times \overline{AC} = \begin{vmatrix} 0 & 1 & -1 \\ 2 & 2 & -4 \end{vmatrix} = (-2, 2, -2)$

$Aréa = 2\sqrt{3}\ u^2$

d) $D(3, 5, -2)$

$\overline{AB} = \overline{CD}$

$(0, 1, -1) = (x, y, z) - (3, 4, -1)$

$(0, 1, -1) + (3, 4, -1) = (x, y, z)$

$(x, y, z) = (3, 5, -2)$

$D(3, 5, -2)$

2 Dados los elementos graficos.

$l: \quad x-3 = \frac{-2y+4}{4} = \frac{4-z}{-1}$

a)

$$\frac{x-3}{1} = \frac{y-2}{-2} = \frac{z-4}{1}$$

$\bar{u} = (1,-2,1) \quad p_0 (3,2,4)$

$l: \quad \bar{p} = (3,2,4) + t(1,-2,1)$

$\bar{p} = (3+t,\ 2-2t,\ 4+t)$

ya que $\overline{AB} \cdot \bar{u} = 0$

$[(3+t,\ 2-2t,\ 4+t) - (1,1,1)] \cdot (1,-2,1) = 0$

$t+2-2(-2t+1)+t+3=0$

$6t+3=0$

$t = \frac{-1}{2}$ así que

$B(3+t,\ 2-2t,\ 4+t)$

$\boxed{B\left(\frac{5}{2},\ 3,\ \frac{7}{2}\right)}$

b) Formula $d = \frac{|(\bar{q}-\bar{p}) \times \bar{u}|}{|\bar{u}|}$

$p_0 (1,1,1)$

$\bar{u} = (1,-2,1)$

$\overline{AP_0} = (2,1,3)$

$\therefore$

$$d = \frac{|(2,1,3) \times (1,-2,1)|}{|(1,-2,1)|} \text{ — (A)}$$

$(2,1,3) \times (1,-2,1) =$

$$\begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 1 & 3 \\ 1 & -2 & 1 \end{vmatrix} = (7,1,5) \text{ — (B)}$$

B en A

$$d = \frac{|(7,1,-5)|}{|(1,-2,1)|} = \frac{\sqrt{75}}{\sqrt{6}} = \frac{5\sqrt{3}}{\sqrt{3}\sqrt{2}}$$

$$d = \frac{5}{\sqrt{2}} \text{ ó } \frac{5\sqrt{2}}{2} \qquad \boxed{d = \frac{5\sqrt{2}}{2} \text{ u}}$$

c)

Como B es el punto medio

$B\left(\frac{5}{2}, 3, \frac{7}{2}\right)$

$A(1,1,1)$

$C(x,y,z)$

$\frac{x+1}{2} = \frac{5}{2}$

$x+1 = 5 \qquad \underline{x=4}$

$\frac{y+1}{2} = 3 \qquad \underline{y=5}$

$\frac{z+1}{2} = \frac{7}{2} \qquad \underline{z=6}$ así que $C(4,5,6)$

d)

$L: \bar{p} = (3+t, 2-2t, 4+t)$

$\bar{u} = (1,-2,1) \qquad P_0(3,2,4)$

$R: \bar{p} = (-2-3\alpha, -3-4\alpha, -4-5\alpha)$

$\bar{v} = (-3,-4,-5) \qquad R_0(-2,-3,-4)$

Ang entre rectas $\quad \cos\theta = \dfrac{\bar{u}\cdot\bar{v}}{|\bar{u}||\bar{v}|}$

$$= \frac{(1,-2,1)\cdot(-3,-4,-5)}{\sqrt{6}\ \sqrt{50}}$$

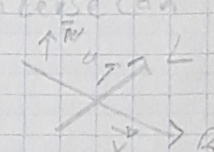
$$= \frac{-3+8-5}{\sqrt{6}\ \sqrt{50}} = \frac{0}{\sqrt{6}\sqrt{50}} = 0$$

$$\theta = \text{ang}\cos(0) = \boxed{90^\circ}$$

c)

$$\bar{N}_0 = \bar{u}\times\bar{v} \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 1 & -2 & 1 \\ -3 & -4 & -5 \end{vmatrix} = (14,2,-10) = 2(7,1,-5)$$

Como L y R intersecan



$\bar{N} = (7,1,-5)$

plano

$\pi : 7x + y - 5z + D = 0$

Sustituyendo en π: a $P_0(3,2,4)$

$\pi : 7(3) + 2, -5(4) + D = 0$

$21 + 2 - 20 + D$

$3 + D = 0$

$D = -3$

Así que

$$\boxed{\pi : 7x + y - 5z - 3 = 0}$$

3

Q (, ,) plano $\pi: 2x+3y-z+4=0$

P (3, -1, 2) $\bar{N}=(2, 3, -1)$

P y Q:

$L: \bar{P} = \overline{PO} + \lambda(\bar{N})$

$\bar{P} = (3, -1, 2) + \lambda(2, 3, -1)$

$$L: \begin{cases} x = 3+2\lambda \\ y = -1+3\lambda \\ z = 2-\lambda \end{cases}$$

Sistuimos x, y, z en el plano π

π:

$2(3+2\lambda) + 3(-1+3\lambda) + -(2-\lambda) + 4 = 0$

$\boxed{6} + 4\lambda \boxed{-3} + 6\lambda \boxed{-2} + \lambda \boxed{+4} = 0$

$11\lambda + 5 = 0$

$\lambda = \frac{-5}{11}$

$\therefore$ λ se sustituye enla ec. recta

$\bar{p} = (3+2(\frac{-5}{11}), -1+3(\frac{-5}{11}), 2-(\frac{-5}{11}))$

$\bar{p} = (\frac{23}{11}, \frac{-26}{11}, \frac{27}{11})$ $\therefore$ $\boxed{Q(\frac{23}{11}, \frac{-26}{11}, \frac{27}{11})}$