Erio Yoshino
NO ABSEN : 27

1. *Bidang u : $\vec{AB} = (3-1, 2-(-2), 6-3)$; $\vec{AC} = (2-1, 4-(-2), -3-3)$

$\vec{AB} \times \vec{AC} \begin{vmatrix} i & j & k \\ 2 & 4 & 3 \\ 1 & 6 & -6 \end{vmatrix} = -24i + 3j + 12k - 4k - 18i - (-12j) = -42i + 15j + 8k$

$= (-42, 15, 8)$

Persamaan bidang u : $(x-1, y+2, z-3)(-42, 15, 8) = 0$

$= -42x + 42 + 15y + 30 + 8z - 24 = 0$

$= -42x + 15y + 8z = -48$

*Persamaan bidang α

$n = n\beta \times nu = \begin{vmatrix} i & j & k \\ 2 & -7 & 2 \\ -42 & 15 & 8 \end{vmatrix} = -56i - 84j + 30k - 294k - 30i - 16j = -86i - 100j - 264k$

$= (-86, -100, -264)$

*(Tes) $n \cdot n\beta = ((-86 \cdot 2) + [-100 \cdot (-7)] + (-264 \cdot 2)) = -172 + 700 - 528 = 0$,, benar

$n \cdot nu = ((-86 \cdot (-42)) + (-100 \cdot 15) + (-264 \cdot 8)) = 3612 - 1500 - 2112 = 0$,, benar

* $PX \cdot n = (x-3, y+4, z-2)(-86, -100, -264) = 0$

$= -86x + 258 - 100y - 400 - 264z + 528 = 0$

$= -86x - 100y - 264z = -386$,,

$= 43x + 50y + 132z = 193$,,

2.a) $\alpha = 2x - 3y + 7z = 9$; $\beta = x + 6y - z = 11$

* $\alpha \times \beta = \begin{vmatrix} i & j & k \\ 2 & -3 & 7 \\ 1 & 6 & -1 \end{vmatrix} = 3i + 7j + 12k - (-2k) - (-2j) - 42i = -39i + 9j + 15k$

$= (-39, 9, 15)$

* anggap $z = 0$

$\alpha = 2x - 3y = 9$ | 2 |
$\beta = x + 6y = 11$ | 1 |

$4x - 6y = 18$
$x + 6y = 11$ +
$5x = 29$
$x = 29/5$
$y = 13/15$

koordinat = $(29/5, 13/15, 0)$

Persamaan vektor =
$(x, y, z) = (29/5, 13/15, 0) + (-39, 9, 15)t$
$= (29/5 - 39t)i + (13/15 + 9t)j + (15t)k$

Persamaan parameter :
$x = 29/5 - 39t$
$y = 13/15 + 9t$
$z = 15t$,,

b).

$\cos\theta = \frac{\alpha \cdot \beta}{\|\alpha\| \|\beta\|} = \frac{2 + (-18) + (-7)}{\sqrt{4+9+49}\ \sqrt{1+36+1}} = \frac{23}{\sqrt{62}\sqrt{38}} = \frac{23}{2\sqrt{589}} = \frac{23}{589}\sqrt{589}$

$\theta = \cos^{-1}\left(\frac{23}{589}\sqrt{589}\right) = 118,284°$

3. $a \times b = \begin{vmatrix} i & j & k \\ 3 & 4 & 7 \\ 2 & 3 & -6 \end{vmatrix} = -24i + 14j + 9k - 8k - 21i - (-18j) = -45i + 32j + k$

$= (-45, 32, 1)$

$P_x \cdot (a \times b) = (x - x_0, y - y_0, z - z_0) \cdot (-45, 32, 1)t = 0$

anggap $t = 1$, $(x_0, y_0, z_0) = (0, 0, 0)$

$= -45x + 32y + z = 0$ //

4.a) $Q \cdot D_1 = (2 + 0 + 0 + 0 + 0 + 0) = 2$

$Q \cdot D_2 = (2 + 0 + 1 + 0 + 0 + 0) = 3$

$Q \cdot D_3 = (0 + 0 + 1 + 0 + 0 + 0) = 1$

$\|D_1\| = \sqrt{1^2 + 1^2 + 0 + 1^2 + 0 + 0} = \sqrt{3}$

$\|D_2\| = \sqrt{1^2 + 1^2 + 1^2 + 0 + 0 + 0} = \sqrt{3}$

$\|D_3\| = \sqrt{0 + 0 + 1^2 + 0 + 1^2 + 1^2} = \sqrt{3}$

$\|Q\| = \sqrt{2^2 + 0 + 1^2 + 0 + 0 + 0} = \sqrt{5}$

* New York post $= \cos(Q, D_1) = \dfrac{\bar{Q} \cdot \bar{D}_1}{\|\bar{Q}\| \|\bar{D}_1\|} = \dfrac{2}{\sqrt{5}\sqrt{3}} = \dfrac{2}{15}\sqrt{15}$

* New York times: $\cos(Q, D_1) = \dfrac{\bar{Q} \cdot \bar{D}_2}{\|Q\| \|D_2\|} = \dfrac{3}{\sqrt{5}\sqrt{3}} = \dfrac{3}{15}\sqrt{15}$

* Los Angeles Times: $\cos(Q, D_3) = \dfrac{\bar{Q} \cdot \bar{D}_3}{\|\bar{Q}\| \|\bar{D}_3\|} = \dfrac{1}{\sqrt{5}\sqrt{3}} = \dfrac{1}{15}\sqrt{15}$

b). Urutan: 1. New York Times
2. New York Post
3. Los Angeles Times

5. * Potongan α & β

$$\left(\begin{array}{ccc|c} 1 & -2 & 4 & 14 \\ -1 & 2 & 15 & -30 \end{array}\right) \xrightarrow{b_2 + b_1} \left(\begin{array}{ccc|c} 1 & -2 & 4 & 14 \\ 0 & 0 & 19 & -16 \end{array}\right) \xrightarrow{b_2 (1/19)} \left(\begin{array}{ccc|c} 1 & -2 & 4 & 14 \\ 0 & 0 & 1 & -16/19 \end{array}\right)$$

$x - 2y + 4z = 14$

$z = -16/19$

* Titik tembus bidang yz ($x = 0$)

$0 - 2y + 4\left(\frac{-16}{19}\right) = 14$

$-2y = 14 + 64/19$

$y = \dfrac{-115}{19}$

$\left(0, \frac{-115}{19}, \frac{-16}{19}\right)$

* Titik tembus bidang xz ($y = 0$)

$x - 2(0) + 4\left(\frac{-16}{19}\right) = 14$

$x = 14 + 64/19$

$x = \dfrac{330}{19}$

$\left(\frac{330}{19}, 0, \frac{-16}{19}\right)$