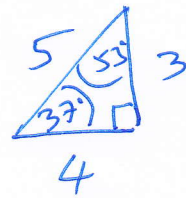
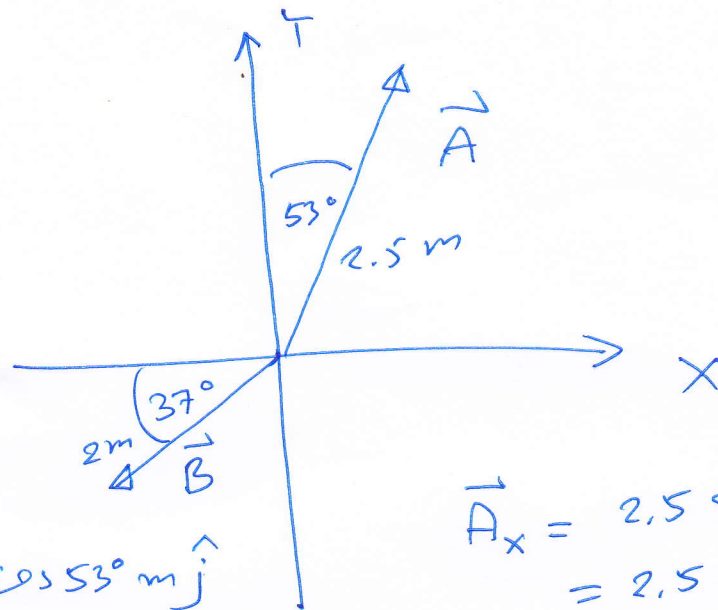


ΠΡΟΣΘΕΤΙΚΗ

(11)



$$\begin{aligned}\vec{A}_y &= 2.5 \cos 53^\circ \text{ m } \hat{j} \\ &= 2.5 \times \frac{3}{5} \text{ m } \hat{j} \\ &= 1.5 \text{ m } \hat{j}\end{aligned}$$

$$\begin{aligned}\vec{A}_x &= 2.5 \sin 53^\circ \text{ m } \hat{i} \\ &= 2.5 \times \frac{4}{5} \text{ m } \hat{i} \\ &= 2 \text{ m } \hat{i}\end{aligned}$$

$$\begin{aligned}\vec{B}_y &= -2 \sin 37^\circ \text{ m } \hat{j} \\ &= -2 \times \frac{3}{5} \text{ m } \hat{j} \\ &= -1.2 \text{ m } \hat{j}\end{aligned}$$

$$\begin{aligned}\vec{B}_x &= -2 \cos 37^\circ \text{ m } \hat{i} \\ &= -2 \times \frac{4}{5} \text{ m } \hat{i} \\ &= -1.6 \text{ m } \hat{i}\end{aligned}$$

$$\begin{aligned}\therefore \text{Προσθετώντας} &= \vec{A} + \vec{B} \\ &= (\vec{A}_x + \vec{A}_y) + (\vec{B}_x + \vec{B}_y) \\ &= (\vec{A}_x + \vec{B}_x) + (\vec{A}_y + \vec{B}_y) \\ &= (2 - 1.6) \text{ m } \hat{i} + (1.5 - 1.2) \text{ m } \hat{j} \\ &= \boxed{0.4 \text{ m } \hat{i} + 0.3 \text{ m } \hat{j}} \quad \# \end{aligned}$$

1.2

$$\vec{A} = 6\hat{i} - 8\hat{j}, \quad \vec{B} = +8\hat{i} + 3\hat{j}$$

$$\vec{C} = 26\hat{i} + 19\hat{j}$$

$$a\vec{A} + b\vec{B} + \vec{C} = \vec{0}$$

$$a(6\hat{i} - 8\hat{j}) + b(-8\hat{i} + 3\hat{j}) + \vec{C} = \vec{0}$$

$\nearrow 26\hat{i} + 19\hat{j}$

$$(6a - 8b + 26)\hat{i} + (-8a + 3b + 19)\hat{j} = \vec{0}$$

$$\hat{i} \parallel \hat{j} \neq \vec{0} \quad \text{or } \vec{0} \neq \vec{0}$$

$$6a - 8b + 26 = 0 \quad \text{or} \quad -8a + 3b + 19 = 0$$

————— ①

————— ②

$$8 \times \text{①} \quad 48a - 64b + 208 = 0 \quad \text{————— ③}$$

$$6 \times \text{②} \quad -48a + 18b + 114 = 0 \quad \text{————— ④}$$

$$\text{③} + \text{④} \Rightarrow -46b = -322$$

$$\boxed{b = 7} \quad \text{————— ⑤}$$

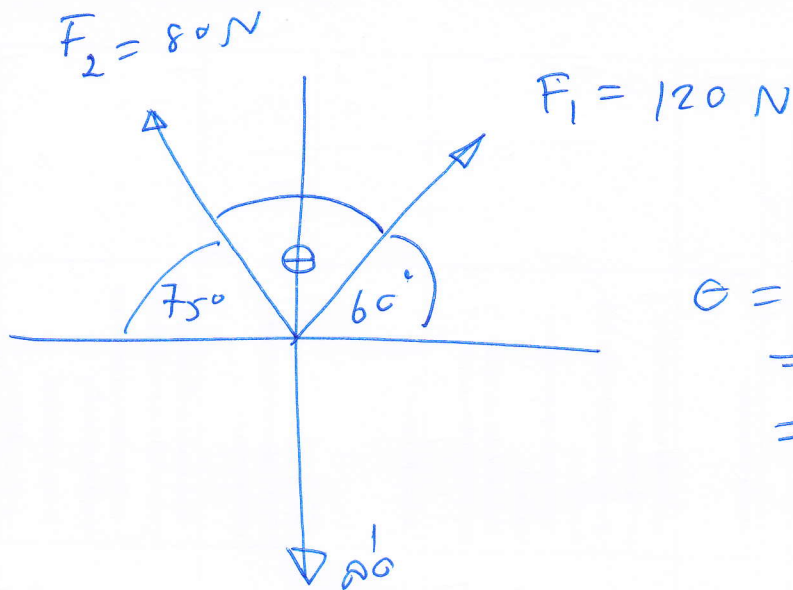
11n4 ⑤ = 20.26 ① $\rightarrow 70$

$$6a - 56 + 26 = 0$$

$$6a = 30$$

$$\boxed{a = 5} \quad \text{————— } 7 \quad \#$$

1.3



$$\begin{aligned} \theta &= 180 - 75 - 60 \\ &= 180 - 135 \\ &= 45 \end{aligned}$$

$$\begin{aligned} \text{Resultant } \Sigma F &= \sqrt{F_1^2 + F_2^2 + 2F_1F_2 \cos \theta} \\ &= \sqrt{F_1^2 + F_2^2 + 2F_1F_2 \cos 45^\circ} \end{aligned}$$

$$\begin{aligned} \Sigma F &= \sqrt{(120)^2 + (80)^2 + 2(120)(80)\frac{\sqrt{2}}{2}} \\ &= \sqrt{14400 + 6400 + 13576.45} \\ &= \sqrt{34376.45} = \boxed{185.4\text{ N}} \end{aligned}$$

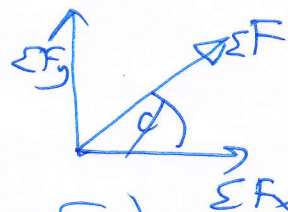
$$F_{1x} = F_1 \cos 60^\circ = 120 \cos 60 = 60\text{ N}$$

$$F_{1y} = F_1 \sin 60^\circ = 120 \times \frac{\sqrt{3}}{2} = 60\sqrt{3}\text{ N}$$

$$F_{2x} = -F_2 \cos 75^\circ = -80 \cos 75 = -20.71\text{ N}$$

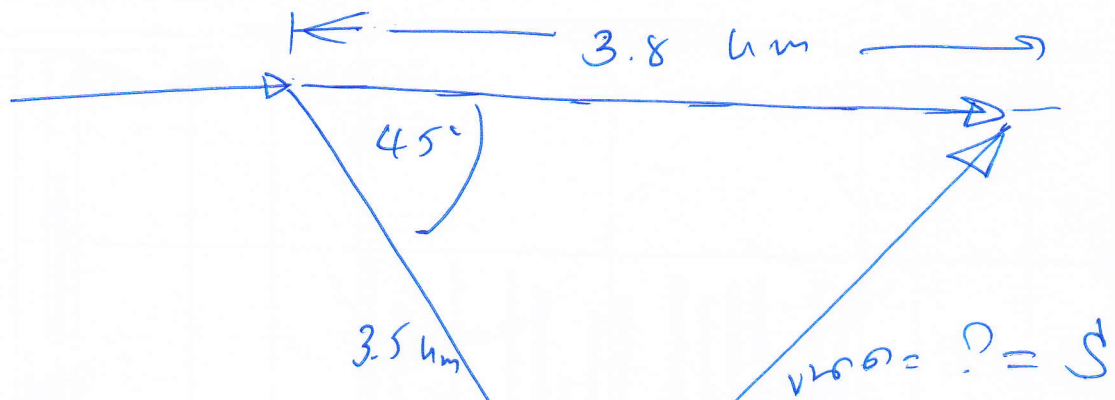
$$F_{2y} = F_2 \sin 75^\circ = 80 \sin 75 = 77.27\text{ N}$$

$$\Sigma F = \sqrt{(\Sigma F_x)^2 + (\Sigma F_y)^2}$$

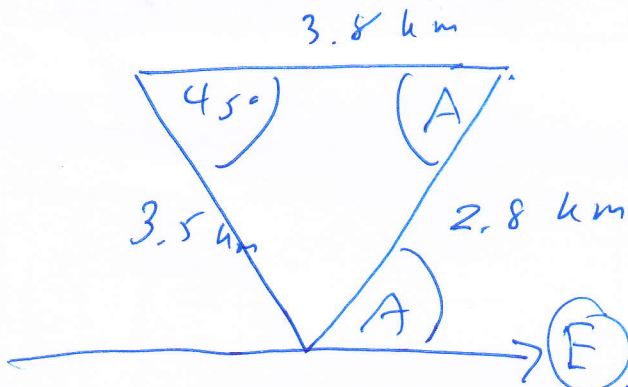


$$\begin{aligned} \tan \phi &= \frac{\Sigma F_y}{\Sigma F_x} = \frac{(77.27 + 60\sqrt{3})\text{ N}}{(60 - 20.71)\text{ N}} = \frac{181.19}{39.29} \end{aligned}$$

1.4



vektor $S = \sqrt{(3.5)^2 + (3.8)^2 - 2 \times 3.5 \times 3.8 \times \cos 45^\circ}$ km
 km
 $= \sqrt{7.89}$
 $= 2.81$ km



nguna sine

$$\frac{3.5}{\sin A} = \frac{2.81}{\sin 45^\circ}$$

$$\sin A = \frac{3.5 \times \sin 45^\circ}{2.81}$$

hasilnya = 0.884

$$A = 61.7^\circ$$

dunia E

21

1.5

$$\vec{A} = 2\hat{i} + 3\hat{j} + \hat{k}, \quad \vec{B} = -4\hat{i} + 2\hat{j} - \hat{k}$$

(n)

$$\vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}| \cos \theta \quad \text{--- (1)}$$

$$|\vec{A}| = \sqrt{4 + 9 + 1} = \sqrt{14}$$

$$|\vec{B}| = \sqrt{16 + 4 + 1} = \sqrt{21}$$

$$\vec{A} \cdot \vec{B} = -8 + 6 - 1 = -3$$

Using eq (1) \Rightarrow To

$$-3 = \sqrt{14} \sqrt{21} \cos \theta$$

$$= \sqrt{7 \times 2} \sqrt{3 \times 7} \cos \theta$$

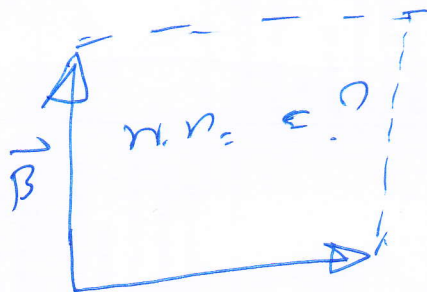
$$\cos \theta = \frac{-3}{7\sqrt{6}}$$

$$= -0.175$$

$$\theta = \cos^{-1}(-0.175)$$

$$= 100.1 \text{ degrees}$$

(v)



n.n. \square Δ Δ

$$= |\vec{A} \times \vec{B}|$$

ans/ans $\vec{A} \times \vec{B} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 3 & 1 \\ -4 & 2 & -1 \end{vmatrix}$

$$= (-5)\hat{i} + 16\hat{j} + 16\hat{k}$$

$$|\vec{A} \times \vec{B}| = \sqrt{25 + 256 + 256} = \sqrt{537}$$

$$= 23.17 \text{ ans/answer} \#$$

$$(1.6) \quad \vec{A} = 4\hat{i} + 3\hat{j} \quad \vec{B} = \hat{i} - 5\hat{j}$$

$$(1) \quad \vec{A} \cdot \vec{B} = |\vec{A}| |\vec{B}| \cos \theta \quad \text{--- (1)}$$

$$\vec{A} \cdot \vec{B} = 4 - 15 = -11$$

$$|\vec{A}| = \sqrt{16 + 9} = 5$$

$$|\vec{B}| = \sqrt{1 + 25} = \sqrt{26}$$

$$\text{In (1)} \Rightarrow -11 = 5\sqrt{26} \cos \theta$$

$$\cos \theta = \frac{-11}{5\sqrt{26}} = -0.432$$

$$\theta = \cos^{-1}(-0.432) = 115.6^\circ$$

$$(2) \quad \vec{A} + \vec{B} = 5\hat{i} - 2\hat{j}, \quad \vec{A} - \vec{B} = 3\hat{i} + 8\hat{j}$$
$$(\vec{A} + \vec{B}) \cdot (\vec{A} - \vec{B}) = |\vec{A} + \vec{B}| |\vec{A} - \vec{B}| \cos \theta$$

$$(\vec{A} + \vec{B}) \cdot (\vec{A} - \vec{B}) = 15 - 16 = -1$$

$$|\vec{A} + \vec{B}| = \sqrt{25 + 4} = \sqrt{29}$$

$$|\vec{A} - \vec{B}| = \sqrt{9 + 64} = \sqrt{73}$$

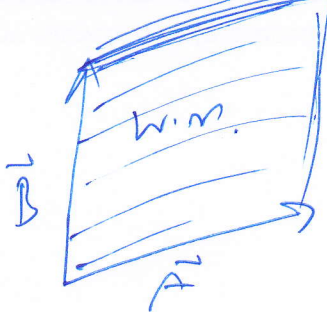
In (2)

$$-1 = \sqrt{29} \sqrt{73} \cos \theta$$

$$\cos \theta = \frac{-1}{\sqrt{29} \sqrt{73}} = -0.022$$

$$\theta = \cos^{-1}(-0.022) = 91.2^\circ$$

9



$$w.n. = |\vec{A} \times \vec{B}|$$

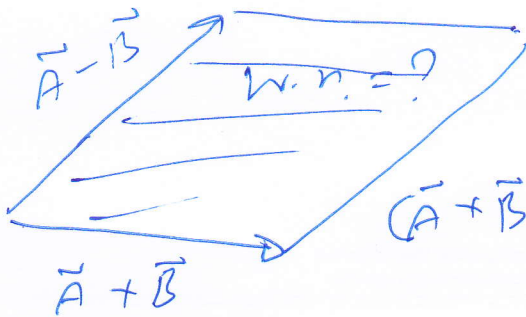
$$\vec{A} \times \vec{B} = (4\hat{i} + 3\hat{j}) \times (\hat{i} - 5\hat{j})$$

$$= \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 4 & 3 & 0 \\ 1 & -5 & 0 \end{vmatrix}$$

$$\vec{A} \times \vec{B} = (-20 - 3)\hat{k} = -23\hat{k}$$

$$|\vec{A} \times \vec{B}| = 23 \text{ area unit} = w.n.$$

10



$$w.n. = |(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B})|$$

$$(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B}) = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 5 & -2 & 0 \\ 3 & 8 & 0 \end{vmatrix}$$

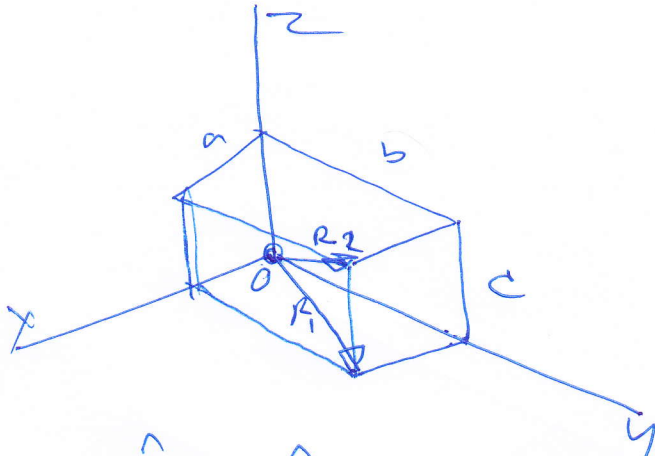
$$= (40 + 6)\hat{k}$$

$$= 46\hat{k}$$

$$|(\vec{A} + \vec{B}) \times (\vec{A} - \vec{B})| = 46 \text{ area unit} = w.n.$$

#

7:7



$$\vec{R}_1 = a\hat{i} + b\hat{j}$$

$$\vec{R}_2 = a\hat{i} + b\hat{j} + c\hat{k}$$

$$\vec{R}_2 - \vec{R}_1 = c\hat{k}$$
