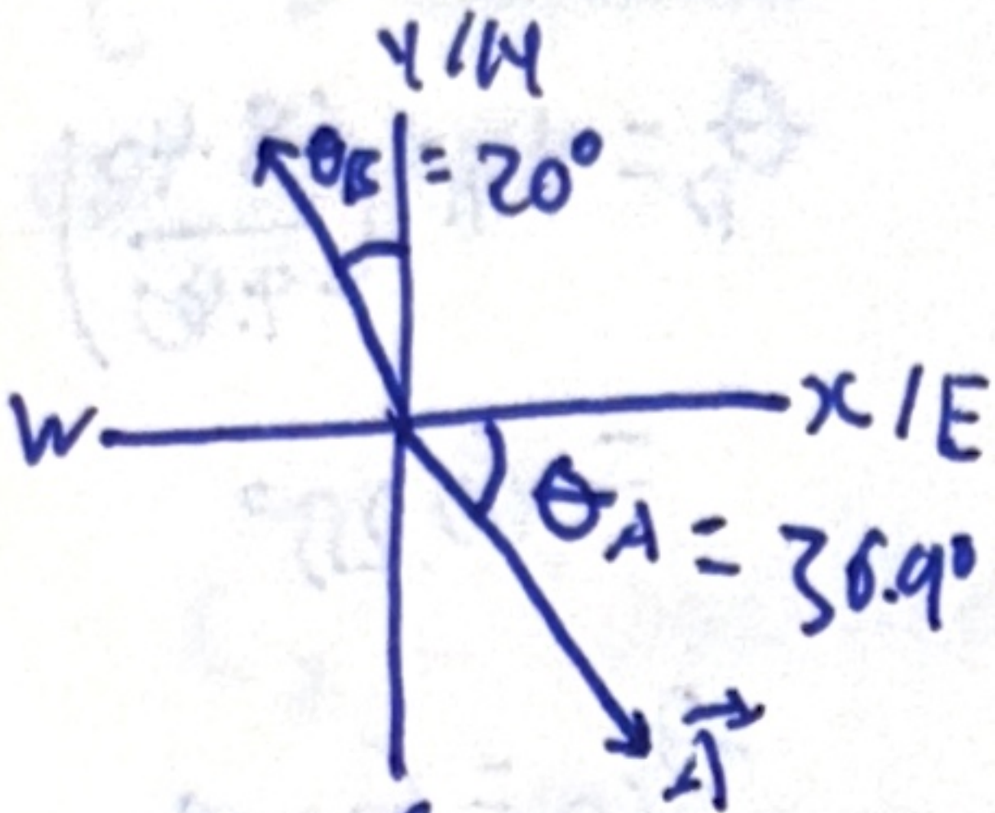
VP 1.10.1 Redo

(By components)



$$A_x = \cos(360° - 36.9°)(5.00)$$

$$A_y = \sin(360° - 36.9°)(5.00)$$

$$B_x = \cos(90° + 20°)(6.40)$$

$$B_y = \sin(90° + 20°)(6.40)$$

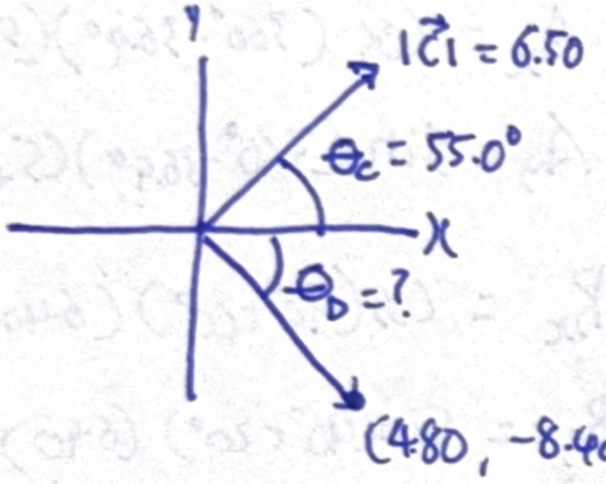
$$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y + A_z B_z$$

$$= (-8.752) + (-18.055) + (0)$$

$$= -26.807$$

$$\approx -26.81$$

VP 1.10.2



$$\theta_D = \tan^{-1}\left(\frac{-8.40}{4.80}\right)$$

$$= -60.255°$$

$$\theta_{CD} = 60.255° + 55°$$

$$= 115.255°$$

$$|\vec{D}| = \sqrt{(4.80)^2 + (-8.40)^2}$$

$$= ~~9.675~~ \; 9.81$$

$$\vec{C} \cdot \vec{D} = |\vec{C}||\vec{D}| \cos(\theta_{CD})$$

(C_{xy} magnitude)

$$= (6.50)(9.675)\cos(-(60.255° + 55°))$$

$$= (6.50)(9.675)\cos(115.255°)$$

~~-34.624~~ $= -26.831$

~~≈ -34.82~~ ≈ -26.83.

~~Because both terms generally point in the~~

for use of angle values, no need for negative values.

$\vec{C} \cdot \vec{D}$ Computation

(C_{xy} component)

$$C_x = (6.50)\cos(55°) = 3.728$$

$$C_y = (6.50)\sin(55°) = 5.324$$

$$C_z = 0.$$

$$\vec{C} \cdot \vec{D} = C_x D_x + C_y D_y + C_z D_z$$

$$= (3.728)(4.80) + (5.324)(-8.40) + (0)(0)$$

$$= -26.8272$$

$$\approx$$

$$\approx -26.83.$$

VP. 1.10.3

$A_x = -5.00 \quad A_y = 3.00 \quad A_z = 0$

$B_x = 2.50 \quad B_y = 4.00 \quad B_z = -1.50$

~~$|\vec{A}||\vec{B}|\cos(\theta_{AB})$~~

~~$\theta_{AB} = \cos^{-1}\left(\frac{1}{|\vec{A}||\vec{B}|}\right)$~~

~~$\vec{A}_{At}$~~ $\vec{A} \cdot \vec{B} = |\vec{A}||\vec{B}|\cos(\theta_{AB})$

$|\vec{A}| = \sqrt{(-5.00)^2 + (3.00)^2 + (0)^2} = \sqrt{34}$

$|\vec{B}| = \sqrt{(2.50)^2 + (4.00)^2 + (-1.50)^2} = \sqrt{24.5}$

$\vec{A} \cdot \vec{B} = A_x B_x + A_y B_y + A_z B_z$

$= (-5.00)(2.50) + (3.00)(4.00) + (0)(-1.50)$

$= -12.50 + 12.00 + 0$

$= -0.50$

~~$-0.50 =$~~ $\theta = \cos^{-1}\frac{\vec{A} \cdot \vec{B}}{|\vec{A}||\vec{B}|} = \cos^{-1}\left(\frac{-0.50}{\sqrt{34}\sqrt{24.5}}\right) = 90.490$

VP1.104

~~$W = \vec{F}\cdot$~~ $W = \vec{F}\cdot\vec{s}$ $W = 26.0\,N\cdot m$

$\vec{s} = (4.00m)\hat{i} + (5.00m)\hat{j}$ $F_x = -12.0N$

1) Find F_y.

To do this, we know that:

$W = \vec{F}\cdot\vec{s}$

$= F_x s_x + F_y s_y + F_z s_z$

SO,

$26.0\,N\cdot m = (-12.0N)(4.00m) + (F_y)(5.00m) + 0$

$F_y = \dfrac{26.0\,N\cdot m - ((-12.0N)(4.00m))}{5.00\,m}$

$= \dfrac{26.0\,N\cdot\cancel{m} + 48.0\,N\cdot\cancel{m}}{5.00\,\cancel{m}} = \dfrac{\cancel{26.0}\,74N}{5.00} = 14.8N$

VP1.10.4 (cont.)

$|\vec{F}| = \sqrt{(-12.0\,N)^2 + (14.8\,N)^2} = \sqrt{380.04}\,N$

$|\vec{s}| = \sqrt{(4.00\,m)^2 + (5.00\,m)^2} = \sqrt{41}\,m$

2) Find θ_{Fs}.

$$\vec{F}\cdot\vec{s} = |\vec{F}|\,|\vec{s}|\cos(\theta_{Fs})$$

$$\theta_{Fs} = \cos^{-1}\left(\frac{\vec{F}\cdot\vec{s}}{|\vec{F}|\,|\vec{s}|}\right)$$

$$= \cos^{-1}\left(\frac{26.0\,N\cdot m}{(\sqrt{380.4})\,N\cdot(\sqrt{41})\,m}\right)$$

$$= \cos^{-1}\left(\frac{26.0}{\sqrt{380.4}\cdot\sqrt{41}}\right)$$

$$= 77.695^\circ$$

$$\approx 77.7^\circ$$

$\leq$.