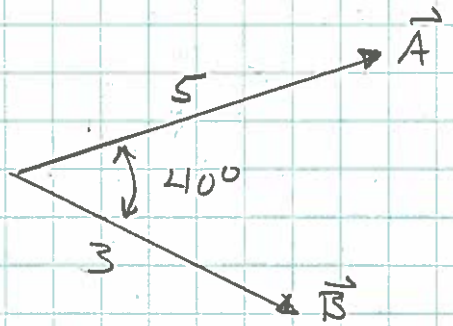
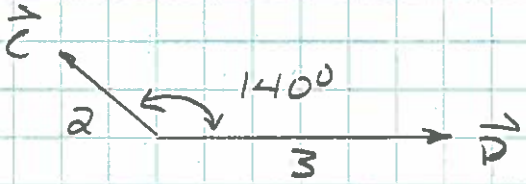
a.)



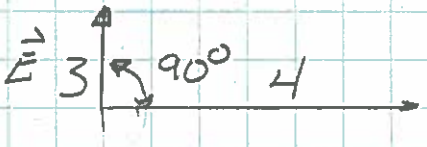
$\vec{A} \cdot \vec{B} = (5)(3)\cos 40° = \underline{11.49}$

b.)



$\vec{C} \cdot \vec{D} = (2)(3)\cos 140° = \underline{-4.60}$

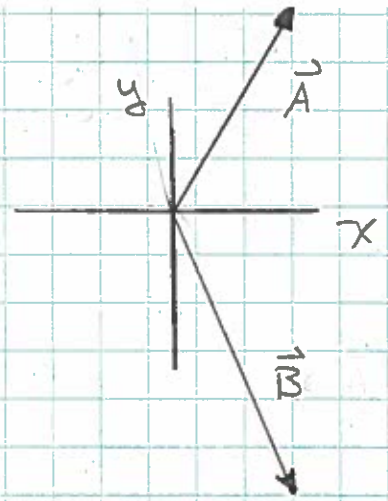
c.)



$\vec{E} \cdot \vec{F} = (3)(4)\cos 90° = \underline{0.0}$

d.) $\vec{A} = 3\hat{i} + 4\hat{j}$

$\vec{B} = 2\hat{i} - 6\hat{j}$



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

$= (3)(2) + (4)(-6)$

$= -18$

e.) $\vec{A} = 3\hat{i} - 2\hat{j}$

$\vec{B} = 6\hat{i} + 4\hat{j}$

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

$= (3)(6) + (-2)(4)$

$= 10$

Also, for part d, what is the angle θ between $\vec{A}$ and $\vec{B}$?

$\vec{A} \cdot \vec{B} = -18 = AB\cos\theta$

So $\theta = \cos^{-1}\left(\frac{-18}{AB}\right)$

$\theta = 124.7°$

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

$B = \sqrt{2^2 + 6^2} = 6.324$