1a)

$$[1, 2, -4] \cdot [2, 3, 5] = 1 \cdot 2 + 2 \cdot 3 + -4 \cdot 5 = \boxed{-12}$$

1b)

$$\left(1^2 + 2^2 + (-4)^2\right)^{1/2} = \sqrt{21}$$

$$\left(2^2 + 3^2 + 5^2\right)^{1/2} = \sqrt{38}$$

$$-12 = \sqrt{21} \cdot \sqrt{38} \cdot \cos\theta$$

$$\cos\theta = \frac{-12}{\sqrt{798}}$$

$$\theta = \operatorname{acos}\left(\frac{-12}{\sqrt{798}}\right) = 2.01 \text{ rad}$$

$$\boxed{\theta > \frac{\pi}{2}, \text{ obtuse}}$$

2)

$$|\vec{B}| = \left(2^2 + 2^2 + 1^2\right)^{1/2} = 3$$

$$|\vec{A}| \cdot 3 \cdot \cos 30^\circ = 6$$

$$\boxed{|\vec{A}| = 2.31}$$

3)

$$\theta = \operatorname{acos} 0 = \boxed{\frac{\pi}{2}}$$