1ai)

$\vec{A} \cdot \vec{B} = 15$

$|\vec{A}| = \sqrt{10}$

$|\vec{B}| = 5$

$15 = 5\sqrt{10}\cos\theta \Rightarrow \theta = \cos^{-1}\left(\frac{3}{\sqrt{10}}\right) = 0.322 \text{ rad}$

$\sqrt{10}\cos 0.322 = \boxed{3}$

1aii)

$5\cos 0.322 = \boxed{4.74}$

1b)

$\vec{A} \cdot \vec{B} = 29$

$|\vec{A}| = \sqrt{83}$

$|\vec{B}| = 5$

$29 = 5\sqrt{83}\cos\theta \Rightarrow \theta = \cos^{-1}\left(\frac{29}{5\sqrt{83}}\right) = 0.881 \text{ rad}$

$\sqrt{83}\cos 0.881 = \boxed{5.80}$

2)

$0 = a + b \Rightarrow \boxed{a = -b}$

$0 > a + b \Rightarrow \boxed{a < -b}$

3)

$\frac{\pi}{2}$ rad