$R_1 = a_x + 2a_y + 3a_z$, $R_2 = 3a_x + 2a_y + a_z$

a) $R_1 \cdot R_2 = 1 \cdot 3 + 2 \cdot 2 + 3 \cdot 1 = 10$

b) $\text{proj}_{R_2} R_1 = \dfrac{R_1 \cdot R_2}{R_2 \cdot R_2} \; (R_2)$

$= \dfrac{10}{3 \cdot 3 + 2 \cdot 2 + 1 \cdot 1} \; (R_2) = \dfrac{10}{14} (3a_x + 2a_y + a_z)$

$= \dfrac{30}{14} a_x + \dfrac{20}{14} a_y + \dfrac{10}{14} a_z$

$= \dfrac{15}{7} a_x + \dfrac{10}{7} a_y + \dfrac{5}{7} a_z$

$= 2.1429 a_x + 1.4286 a_y + 0.7143 a_z$

c) $R_1 \cdot R_2 = |R_1||R_2| \cos\theta$

$\cos\theta = \dfrac{10}{\sqrt{1^2+2^2+3^2}\sqrt{3^2+2^2+1^2}}$

$\cos\theta = \dfrac{10}{14} = \dfrac{5}{7}$

$\theta = 44.415^\circ = 0.7752 \text{ rad}$