1. $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 0$

$\cos\beta = \sqrt{1 - \cos^2\alpha - \cos^2\gamma} = \sqrt{1 - 0.5^2 - 0.5^2}$

$\cos\beta = 0.707 \quad \beta = 45^\circ$

$\vec{F} = 500 \times \cos 120^\circ i + 500 \times \cos 45^\circ j + 500 \times \cos 60^\circ k$

$= -250 i + 353.5 j + 250 k$

2. BE (4, 3, →) $u_{BE} = \frac{4}{\sqrt{29}} i + \frac{3}{\sqrt{29}} j + \frac{2}{\sqrt{29}} k$

$F_x = \frac{4}{5.39} \times 600 = 445.7\ N$

$F_y = \frac{3}{5.39} \times 600 = 334 N$

$F_z = \frac{2}{5.39} \times 600 = 222.63 N$

DE = (0, 3, 0) $u_{DE} = \frac{0}{3} i + \frac{3}{3} j + \frac{0}{3} k$

$F_{DE//} = 334 \times \frac{3}{3} = 334 N$

$F_{DE\perp} = \sqrt{600^2 - 334^2} = 498\ N$