Question

Horizontal Forces:

$$F_{hres} = F_2 - F_4 + F_5 \cdot \cos 60^\circ = 40 - 40 + 50 \cdot \frac{1}{2} = 25\ N.$$

Vertical Forces:

$$F_{vres} = F_1 - F_3 + F_5 \cdot \sin 60^\circ = 62 - 85 + 50 \cdot \frac{\sqrt{3}}{2} \approx 20.3\ N.$$

Resultant Force:

$F_{res} = \sqrt{F_{vres}^2 + F_{hres}^2} = \sqrt{20.3^2 + 25^2} \approx 32.2\ N$. The direction:

$$\cos\alpha = \frac{25\ \text{N}}{32.2\ \text{N}} \Rightarrow \alpha = \arccos\left(\frac{25\ \text{N}}{32.2\ \text{N}}\right) \approx 39^\circ.$$

So, we can say that sixth force should be 32.2 N in magnitude and $180^\circ + 39^\circ = 219^\circ$ in direction.

Answer: magnitude: 32.2 N; direction: 219°.