Question #27603

Two forces of 30N and 25N are acting on a particle at an angle of 30 degree between them.Find the magnitude of sum of the two forces and angle of resultant force with both smaller and larger vector?
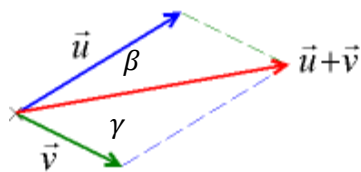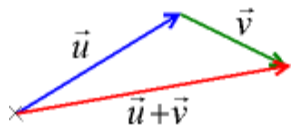
Solution:

Let:

$U = 30N$

$V = 25N$

$\alpha = 30°$

$U + V = ?, \beta = ?, \gamma = ?$

According to the parallelogram rule:

$U + V = \sqrt{U^2 + V^2 + 2UV cos\alpha}$

$U + V = \sqrt{30^2 + 25^2 + 2*30*25*cos30°} = 53.14\ N$

From triangle:

$\beta = \dfrac{\alpha * \frac{V}{U}}{\frac{U}{V} + \frac{V}{U}} = 12.3°$

$\gamma = \dfrac{\alpha * \frac{U}{V}}{\frac{U}{V} + \frac{V}{U}} = 17.7°$

Answer: the resultant force is 53.14N, the angle of resultant force with smaller vector is 17.7^0 , the angle of resultant force with larger vector is 12.3^0.