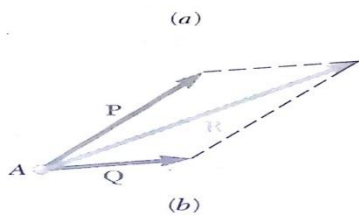


## FAQ's

### 1. Define Parallelogram law of forces

When two forces meeting at a point are represented in magnitude and direction by the two adjacent sides of a parallelogram then the resultant of the two forces is represented in magnitude and direction by the diagonal of the parallelogram passing through that point.



Here R is the resultant of forces p and Q

### 2. Define principle of equilibrium

An object subjected to coplanar forces will be in equilibrium if the algebraic sum of all external forces is zero and the algebraic sum of moments of all forces about a point in that plane is zero.

### 3. Define Lami's theorem

If three forces meeting at a point are in equilibrium then each force will be proportional to the sine of the angle between the other two forces.

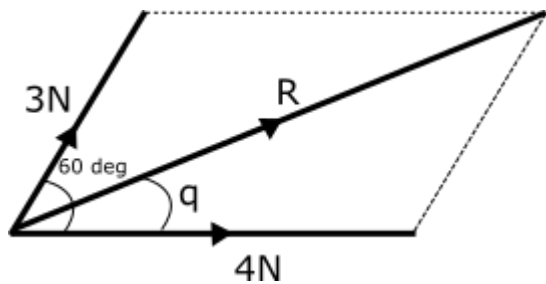
$$\frac{F_1}{\sin \beta} = \frac{F_2}{\sin \gamma} = \frac{F_3}{\sin \alpha}$$

#### 4. Define moment of force

Moment of a force about a point is the product of the force and the perpendicular distance between the line of action of the force and the point.

#### 5. Find resultant using parallelogram law of forces

two forces of 3 N and 4 N are acting at a point such that the angle between them is 60 degrees. Find the resultant force



Answer:

Magnitude R of the resultant force is  $R = \sqrt{3^2 + 4^2 + 2 \times 3 \times 4 \cos 60 \text{ deg}}$

$$= \sqrt{9 + 16 + 12} = \sqrt{37} = 6.08 \text{ N}$$

Direction of R is given by finding the angle q

$$\tan q = (3 \sin 60 \text{ deg}) / (4 + 3 \cos 60 \text{ deg}) = 0.472$$

$$q = \tan^{-1} 0.472$$

$$= 25.3 \text{ deg}$$

Thus **R** is 6.08 N in magnitude and is at an angle of 25.3 deg to the 4 N force.