**FORCE PROBLEMS**

**RESOLVING FORCES**

A particle is in equilibrium under the action of 4 forces of magnitude 5N, 8N, PN and QN as shown.
Find P and Q

Two forces P and Q act on a particle. P has magnitude 7N & acts due north and the resultant of P and Q is a force of magnitude 10N acting in a direction with bearing 120 degrees.
Find the magnitude and direction of Q, giving the direction as a bearing.

Three forces act in the same plane as shown and are in equilibrium.
Find F and x
A smooth bead B is threaded on a light inextensible string. The ends of the string are attached to two fixed points A and C where B is vertically above C. The bead is held in equilibrium by a horizontal force of magnitude 2 N. The sections AB and BC of the string make angles of 30 degrees and 60 degrees with the vertical respectively.

(a) Find the tension in the string
(b) Find the mass of the bead to the nearest gram

\[ \Sigma F = ma \quad \downarrow \quad a = 0 \]

\[ \Sigma F = ma \quad \leftrightarrow \quad a = 0 \]
The coefficient of friction $\mu$ is a measure of the limiting (max) frictional force for two surfaces in rough contact. Smooth surface: $\mu = 0$

Friction opposes motion.

If a particle is moving on a rough surface, it is in limiting equilibrium (on the point of moving) when friction is at its maximum.

$F = \mu R$

Friction can be anywhere from 0 to $\mu R$ normal reaction between particle and surface.

**Friction**

A stone of mass 8 kg is at rest on a rough slope inclined at 23 degrees to the horizontal. A force of magnitude 9 N acts on the box at an angle of 10 degrees to the slope.

Calculate the coefficient of friction between the stone and the slope, given that the force of 9 N is only just large enough to stop the stone sliding down the slope.