Worked example

A particle of mass 4kg is sliding down a rough slope that is inclined at $60°$ to the horizontal.
Given that the acceleration of the particle is 2 ms^{-2}, find the coefficient of friction μ between the particle and the slope.

Your turn

A particle of mass 2kg is sliding down a rough slope that is inclined at $30°$ to the horizontal.
Given that the acceleration of the particle is 1 ms^{-2}, find the coefficient of friction μ between the particle and the slope.

0.46 (2 sf)

Worked example

A box of mass $4\ kg$ is held in equilibrium on a fixed rough inclined plane by a rope.
The rope lies in a vertical plane containing a line of greatest slope of the inclined plane.
The ropes is inclined to the plane at an angle α, where $\tan\alpha = \frac{5}{12}$, and the plane is at an angle of $45°$ to the horizontal.
The coefficient of friction between the box and the inclined plane is $\frac{1}{4}$ and the box is on the point of slipping up the plane.
By modelling the box as a particle and the rope as a light inextensible string, find the tension in the rope.

Your turn

A box of mass $2\ kg$ is held in equilibrium on a fixed rough inclined plane by a rope.
The rope lies in a vertical plane containing a line of greatest slope of the inclined plane.
The ropes is inclined to the plane at an angle α, where $\tan\alpha = \frac{3}{4}$, and the plane is at an angle of $30°$ to the horizontal.
The coefficient of friction between the box and the inclined plane is $\frac{1}{3}$ and the box is on the point of slipping up the plane.
By modelling the box as a particle and the rope as a light inextensible string, find the tension in the rope.

$15\ N$ (2 sf)