

**REVISION: FORCES**

**18 MARCH 2014**



**Lesson Description**

In this lesson we revise:

- Investigating Forces
- The Force of Friction
- Forces in Equilibrium



**Improve your Skills**

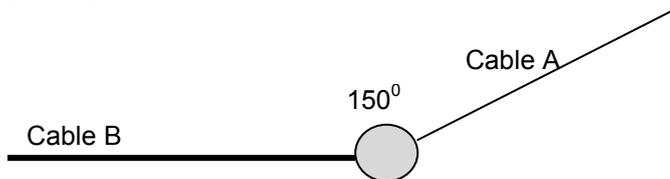
**Investigation Forces**

**Question 1**

Xoli exerts a force of 8N on a box placed on a horizontal frictionless surface. At the same time, Pretty exerts a horizontal force of 10N at an angle of  $90^\circ$  to the force Xoli applies. Calculate the magnitude and direction of the resultant of these two forces.

**Question 2**

A large metal sphere with a mass of 500kg is suspended by cables on a construction site as shown in the sketch below.

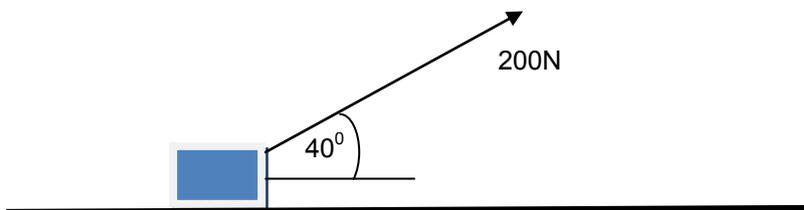


- Draw a free body diagram to show all the forces acting on the metal sphere
- Draw a sketch to show the resultant of the forces acting on the sphere:

**The Force of Friction**

**Question 1**

A 200 N force is applied on a 5 kg crate at an angle of  $40^\circ$  to the horizontal as shown. As the crate moves to the right it experiences a frictional force of 18 N.



- 1.1 Draw a labelled free body diagram showing all the forces acting on the crate whilst on motion.
- 1.2 Calculate the horizontal component of the force.
- 1.3 What is the magnitude and direction of the resultant force acting on the crate?
- 1.4 Find the coefficient of kinetic friction of the surface.

### Question 2

Thabo pulls a 10 kg block on a rough incline at  $30^\circ$  to the horizontal using a force of 280 N. The force friction between the block and the surface is 48 N.

- 1.1 Draw a labelled free body diagram showing all the forces acting on the block.
- 1.2 Calculate the
  - 1.2.1 Resultant force acting on the block.
  - 1.2.2 Normal force exerted on the block by the surface.

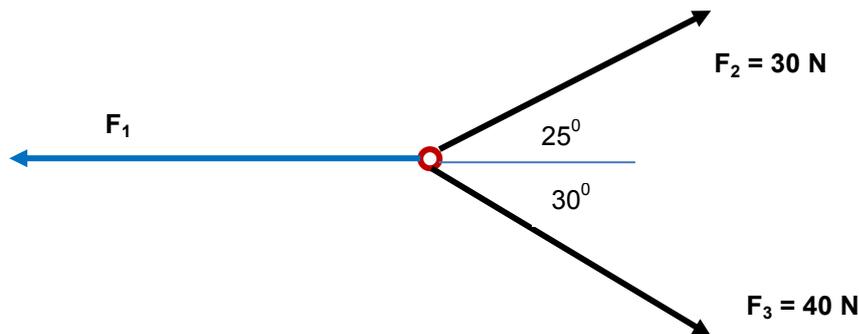
## Forces in Equilibrium

### Question 1

An object of mass 2 kg hangs from a cable. A man pulls the object horizontally with a force of 16 N so that the cable makes an angle of  $45^\circ$  with the vertical.

- 1.1 Draw a free body diagram showing all the forces acting on the object.
- 1.2 Calculate the weight of the object.
- 1.3 Find the magnitude of the equilibrant.

### Question 2



A free body diagram showing three forces in equilibrium is shown above.

Find the magnitude of  $F_1$  by means of construction.