2.1) Work done

Worked example

A horizontal force of 16 N moves a box 2.5 m across a horizontal floor. Calculate the work done by the force.

Your turn

A horizontal force of 8 N moves a box 5 m across a horizontal floor. Calculate the work done by the force.

$40\ J$

Worked example

An object is pulled across a horizontal floor by a horizontal rope. The object moves at a constant speed and there is a constant resistance to motion. When the case has moved a distance of $24\ m$ the work done is $96\ J$. Calculate the magnitude of the resistance.

Your turn

An object is pulled across a horizontal floor by a horizontal rope. The object moves at a constant speed and there is a constant resistance to motion. When the case has moved a distance of $12\ m$ the work done is $96\ J$. Calculate the magnitude of the resistance.

$8\ N$

Worked example

An object of mass $15\ kg$ is raised vertically at a constant speed by means of a vertical cable. Calculate the work done when the object is raised a distance of $14\ m$.

Your turn

An object of mass $30\ kg$ is raised vertically at a constant speed by means of a vertical cable. Calculate the work done when the object is raised a distance of $7\ m$.

$2100\ J$ (2 sf)

Worked example

A package of mass 4 kg is pulled at a constant speed up a rough plane which is inclined at 60° to the horizontal. The coefficient of friction between the package and the surface is 0.7. The package is pulled 24 m up a line of greatest slope of the plane. Calculate:

a) The work done against gravity
b) The work done against friction
c) The total work done by the pulling force.

Your turn

A package of mass 2 kg is pulled at a constant speed up a rough plane which is inclined at 30° to the horizontal. The coefficient of friction between the package and the surface is 0.35. The package is pulled 12 m up a line of greatest slope of the plane. Calculate:

a) The work done against gravity
b) The work done against friction
c) The total work done by the pulling force.

a) 118 *J* (3 sf)
b) 71.3 *J* (3 sf)
c) 189 *J* (3 sf)

Worked example

An object is pulled 30 m across a smooth horizontal plane by a force of magnitude $54\ N$. The force is inclined at 50° to the horizontal.
By modelling the object as a particle calculate the work done by the force.

Your turn

An object is pulled 15 m across a smooth horizontal plane by a force of magnitude $27\ N$. The force is inclined at 25° to the horizontal.
By modelling the object as a particle calculate the work done by the force.

$367\ J$ (3 sf)