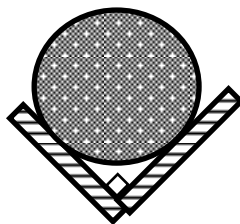


Edexcel AS Mathematics Force and Newton's laws of motion

Section 1: Force diagrams and equilibrium

Exercise level 1

1. Draw clear diagrams to show the forces acting on the objects in *italics*.
 - (i) A *television* sitting on a table
 - (ii) A *circus artist* hanging at rest from a trapeze
 - (iii) The *middle box* in a pile of 3 boxes stacked on the floor
 - (iv) A *tennis ball* as it moves through the air (ignoring air resistance)
 - (v) A *parachutist* with their parachute open as they fall through the air
 - (vi) A *plank* supported at each end by a vertical cable
 - (vii) A *ladder* on rough ground leaning against a smooth wall
 - (viii) A cylinder at rest between two smooth surfaces at 90° to each other (see diagram below)



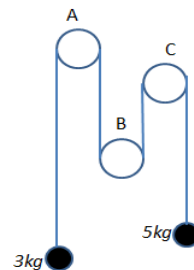
2. A bucket of mass 5 kg hangs on a vertical rope which is also attached to a beam. Draw a diagram to show the forces on the beam and the bucket.

3. Particles of mass 3 kg and 5 kg are attached to the ends of a light, inextensible string. The string passes around fixed, smooth pulleys at A, B and C. The system is released from rest with the string taut.

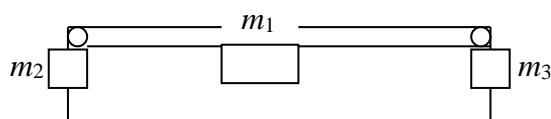
The tension in the string is T N.

What information given tells you that this tension is the same throughout the string?

Draw a diagram to show the forces acting on the 3 kg mass and a separate diagram to show the forces acting on the 5 kg mass.



- 4.



In the diagram above, mass m_1 lies on a rough horizontal table and is connected to masses m_2 and m_3 , where $m_3 > m_2$, by light inextensible strings passing over smooth pulleys.

Draw diagrams showing all of the forces acting on each of the masses.