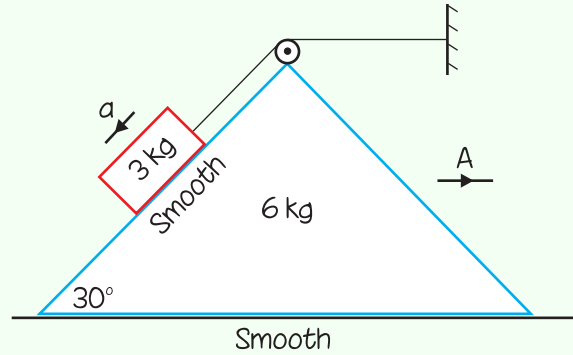
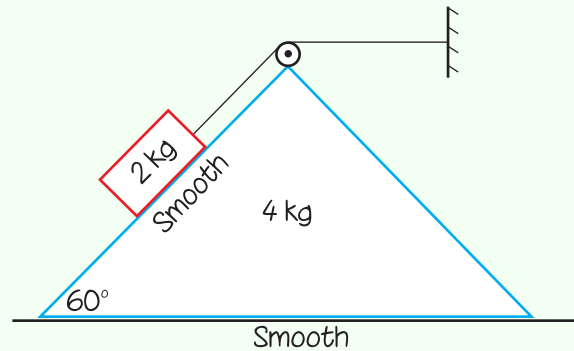


EXERCISE 12. WEDGES 3

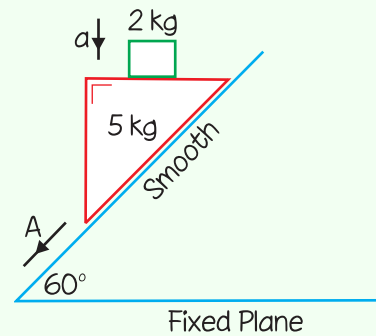
1. Write down a formula connecting a to A .
Write down two equations for the 3 kg mass and two equations for the wedge. The reaction force between the 3 kg mass and the wedge is R . The tension in the connecting string is T . The reaction between the wedge and the surface is N .



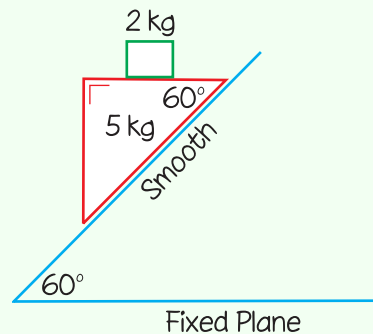
2. The 2 kg particle moves down the plane with acceleration a and the wedge moves to the right with acceleration A . Prove that the acceleration of the wedge is $\frac{g\sqrt{3}}{6}$.



3. Write down a formula connecting a to A if the 2 kg mass remains in contact with the moving wedge. Put in all the forces and write down one equation for the 2 kg mass and two equations for the wedge where R is the reaction between the 2 kg mass and the wedge and S is the reaction between the wedge and the fixed plane.



4. A wedge of mass 5 kg slides down a fixed plane. Show that the acceleration of the 2 kg particle is $\frac{21}{26}g$. Find the reaction between the wedge and the fixed plane.



ANSWERS

Exercise 12

1. $a = A$

$$3 \text{ kg mass: } \frac{3g}{2} - T = 3 \left(a - \frac{\sqrt{3}A}{2} \right), R - \frac{3\sqrt{3}g}{2} = -\frac{3A}{2}$$

$$\text{Wedge: } T - \frac{\sqrt{3}T}{2} + \frac{R}{2} = 6A, N - \frac{T}{2} - \frac{\sqrt{3}R}{2} - 6g = 0$$

3. $a = \frac{\sqrt{3}}{2} A$

$$2 \text{ kg mass: } 2g - R = 2a$$

$$\text{Wedge: } R + 5g - \frac{1}{2}S = 5A \frac{\sqrt{3}}{2}, S\sqrt{3} = 5A$$

4. $\frac{35}{13} g \text{ N}$