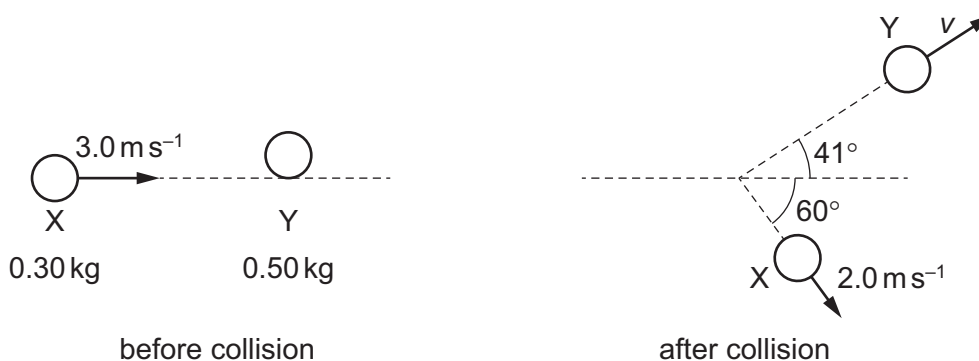


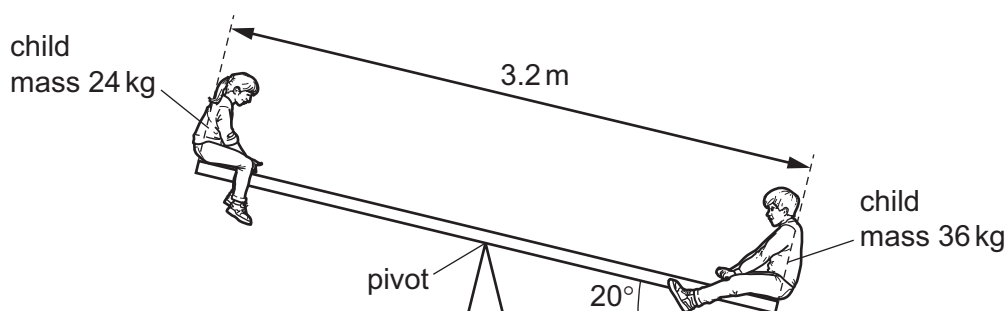
- 10** An object X of mass  $0.30\text{ kg}$  is travelling in a straight line at a constant velocity of  $3.0\text{ ms}^{-1}$  on a horizontal frictionless surface. Object X collides with a stationary object Y of mass  $0.50\text{ kg}$ .

After the collision, X moves with a velocity of  $2.0\text{ ms}^{-1}$  at an angle of  $60^\circ$  to its direction before the collision. Object Y moves with a velocity  $v$  at an angle of  $41^\circ$  to the direction of X before the collision, as shown.



What is the value of  $v$ ?

- A**  $0.80\text{ ms}^{-1}$       **B**  $1.2\text{ ms}^{-1}$       **C**  $1.6\text{ ms}^{-1}$       **D**  $1.8\text{ ms}^{-1}$
- 11** A uniform rigid beam of length  $3.2\text{ m}$  is pivoted at its centre. Two children sit at the opposite ends of the beam, as shown.



One child has a mass of  $24\text{ kg}$ . The other child has a mass of  $36\text{ kg}$ . The heavier child causes one end of the beam to permanently rest on the ground, so that the beam makes an angle of  $20^\circ$  to the horizontal ground.

What is the moment of the weight of the  $24\text{ kg}$  child about the pivot?

- A**  $72\text{ Nm}$       **B**  $130\text{ Nm}$       **C**  $350\text{ Nm}$       **D**  $380\text{ Nm}$