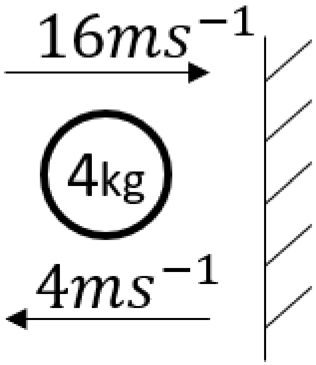
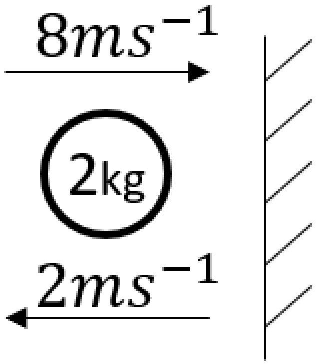
4.3) Loss of kinetic energy

Worked example	Your turn
Find the loss in kinetic energy	Find the loss in kinetic energy
	 $60\ J$

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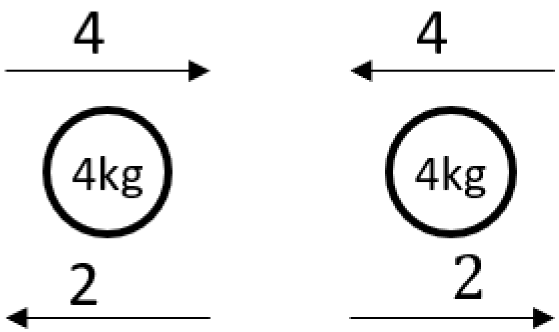
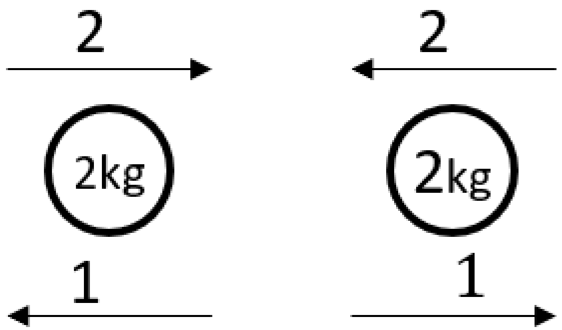
Worked example	Your turn
Find the total loss in kinetic energy	Find the total loss in kinetic energy





$6\ J$

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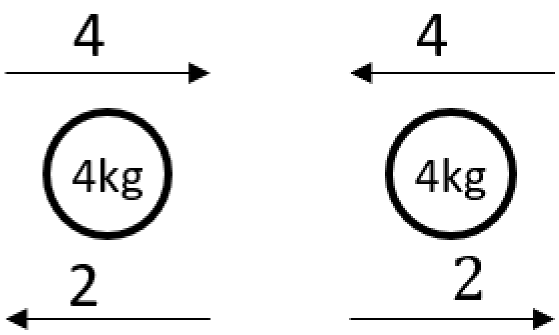
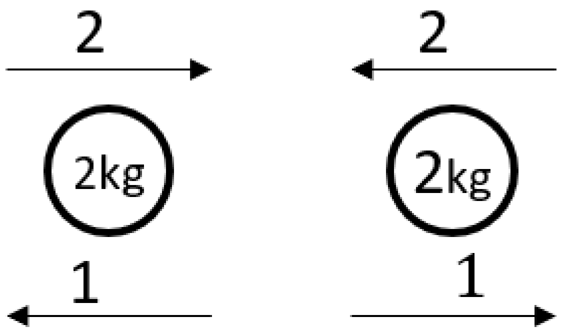
Worked example	Your turn
Find the percentage of kinetic energy lost in the collision.	Find the percentage of kinetic energy lost in the collision.





75%

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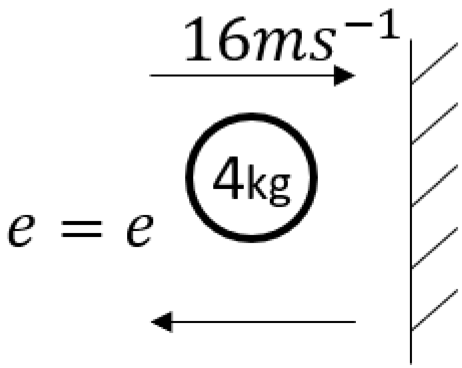
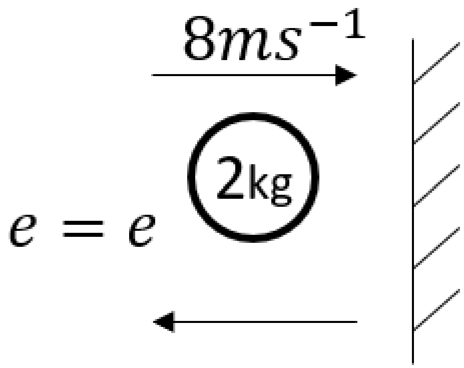
Worked example

Find the loss in kinetic energy, in terms of e



Your turn

Find the loss in kinetic energy, in terms of e



$64(1 - e^2)$

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Worked example	Your turn
Two spheres A and B have massed 6 kg and 10 kg respectively. A and B move towards each other in opposite directions along the same straight line on a smooth horizontal surface with speeds 6 ms^{-1} and 4 ms^{-1} respectively. Given that the coefficient of restitution is $\frac{2}{5}$, find: a) The velocities of the spheres after the collision b) The loss of kinetic energy due to the impact	Two spheres A and B have massed 3 kg and 5 kg respectively. A and B move towards each other in opposite directions along the same straight line on a smooth horizontal surface with speeds 3 ms^{-1} and 2 ms^{-1} respectively. Given that the coefficient of restitution is $\frac{3}{5}$, find: a) The velocities of the spheres after the collision b) The loss of kinetic energy due to the impact a) A: Direction reversed and speed 2 ms^{-1} B: Direction reversed and speed 1 ms^{-1} b) 15 J

Worked example	Your turn
A gun of mass 1200 kg fires a shell of mass 24 kg with speed $400\ ms^{-1}$. a) Find the velocity of the gun after firing b) Find the total kinetic energy generated on firing c) Show that the ratio of the energy of the gun to the energy of the shell is equal to the ratio of the speed of the gun to the speed of the shell after firing	A gun of mass 600 kg fires a shell of mass 12 kg with speed $200\ ms^{-1}$. a) Find the velocity of the gun after firing b) Find the total kinetic energy generated on firing c) Show that the ratio of the energy of the gun to the energy of the shell is equal to the ratio of the speed of the gun to the speed of the shell after firing a) Direction of gun reversed and speed $4\ ms^{-1}$ b) $244800\ J$ c) Shown. Both ratios $1:50$

Worked example	Your turn
Two particles A and B, of masses 400g and 600g respectively, are connected by a light inextensible string. The particles are side by side at rest on a smooth floor and A is projected with speed $12ms^{-1}$ directly away from B. When the string becomes taut, particle B is jerked into motion and A and B then move with a common speed in the direction of the projection of A. Find: a) the common speed of the particles after the string becomes taut b) The loss in kinetic energy due to the jerk	Two particles A and B, of masses 200g and 300g respectively, are connected by a light inextensible string. The particles are side by side at rest on a smooth floor and A is projected with speed $6ms^{-1}$ directly away from B. When the string becomes taut, particle B is jerked into motion and A and B then move with a common speed in the direction of the projection of A. Find: a) the common speed of the particles after the string becomes taut b) The loss in kinetic energy due to the jerk a) $2.4\ ms^{-1}$ b) $2.16\ J$