Collisions

1 Impulse and momentum

Impulse=$mv - mu$=Ft

Total momentum before collision=total momentum after

2 Coefficient of restitution

This tells us how well something bounces, it is given the symbol **e**.

If $e = 1$ the ball returns to it's original height

If $e = 0$ the ball doesn't bounce

$$e = \frac{\text{Speed of seperation}}{\text{Speed of approach}}$$

2.1 Alternate form of coefficient of restitution formula

$mgh = \frac{1}{2}mv^2$

$v = \sqrt{2gh}$

$$e = \frac{\sqrt{2gh_2}}{\sqrt{2gh_1}}$$

$$e = \frac{\sqrt{h_2}}{\sqrt{h_1}}$$

h_2 - the height the ball bounces back to

h_1 - the height the ball is dropped from

2.2 Calculations involving coefficient of restitution

When doing calculations involving the coefficient of restitution both the calculation for CoR and conservation of momentum will be needed.

Conservation of momentum:

$m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$

Coefficient of restitution

$$e = \frac{v_1}{u_1}$$