Kinematics

1. $v = u + at$

   $s = ut + \frac{1}{2}at^2$

   $v^2 = u^2 + 2as$

2. Sign Convention

Motion in a circle

1. Horizontal circle
   - Hor $F_R = \frac{mv^2}{r}$
   - ver   Eq. of forces

   Vertical circle
   - $F_R = \frac{mv^2}{r}$
   - COE (to find v)   JYJ Q 32

Linear momentum (P)

1. Force due to flowing liquid

   $$F = \frac{dP}{dt} = (V_f - V_i)\frac{dm}{dt} \qquad \& \; P = m(V_f - V_i)$$

2. Momentum-Impulse Theorem

   $$\frac{dP}{dt} = F \Rightarrow dP = Fdt$$

   $$\int_{Pi}^{Pf} dP = \int_0^t Fdt$$

   $$(P_f - P_i) = \int_0^t Fdt$$

3. Collisions

   (a) Elastic (total K.E is conserved)
   - PCM
   - Relative speed Theorem $U_1 - U_2 = V_2 - V_1$

(b) Inelastic (i.e. stick together after collision)
        –PCM