1. $S = bt + 0.5ct^2$

$$\frac{dS}{dt} = V = b + ct$$

$$\frac{dV}{dt} = a_t = c$$

$$a_n = \frac{V^2}{R}$$

$$= \frac{(b+ct)^2}{R}$$

$$\therefore a_t = c \quad , \quad a_n = \frac{(b+ct)^2}{R}$$