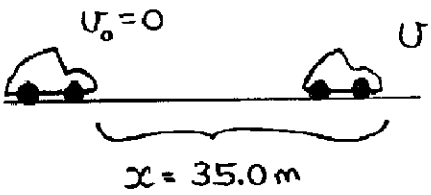
B1.

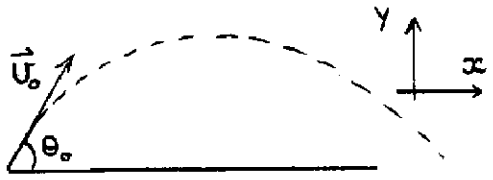


$$v^2 = v_0^2 + 2ax$$

$$a = \frac{v^2 - v_0^2}{2x}$$

$$a = \frac{(15.0\ m/s)^2 - 0}{2(35.0\ m)} = 3.21\ m/s^2$$

B2.



$\theta_0 = 60.0°$

$v_0 = 30.0\ m/s$

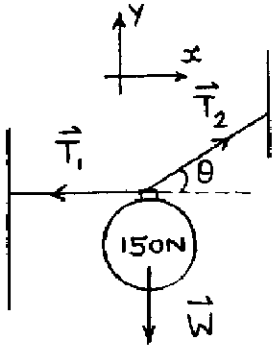
$t = 2.00\ s$

v is constant in x-dir'n:

$$x = v_x t = (v_0 \cos\theta_0)t = (30.0\ m/s)(\cos 60.0°)(2.00\ s)$$

$$x = 30.0\ m$$

B3.



Ball is in equilibrium so $\Sigma \vec{F} = 0$

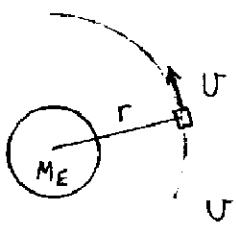
$\Sigma F_x = 0$ and $\Sigma F_y = 0$

$T_2 \cos\theta - T_1 = 0$ $\quad$ $T_2 \sin\theta - W = 0$

$$T_2 = \frac{W}{\sin\theta} = \frac{150\ N}{\sin 30.0°}$$

$$T_2 = 300\ N$$

B4.



Circular Motion: $\Sigma F = ma_c$

$$\frac{GM_E m}{r^2} = \frac{mv^2}{r}$$

$$v = \sqrt{\frac{GM_E}{r}} = \sqrt{\frac{(6.67 \times 10^{-11}\ N \cdot m^2/kg^2)(5.98 \times 10^{24}\ kg)}{6.90 \times 10^6\ m}}$$

$$v = 7.60 \times 10^3\ m/s$$