9) $F = ma \Rightarrow \frac{G M_E m_H}{(R_E+r)^2} = \frac{m_H V^2}{(R_E+r)} \Rightarrow \frac{G M_E}{(R_E+r)} = V^2$

$$V = \sqrt{\frac{GM_E}{(R_E+r)}} = \left(\frac{6.7\times10^{-11} \otimes 6\times10^{24}}{7.01\times10^{6}\,m}\right)^{1/2} = \boxed{7.5\times10^{3}\ m/s}$$

once we know V we can find

$$T = \frac{2\pi(R_E+r)}{V} = \frac{6.28\cdot(7.01\times10^{6}\,m)}{7.5\times10^{3}} = \boxed{5.87\times10^{3}\ sec}$$

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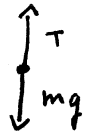
10) FBD 

$F = ma \quad T - mg = \frac{mv^2}{r} \quad T = m\left(g + \frac{v^2}{r}\right)$

$$T = 35\left(9.8 + \frac{(4.2)^2}{6.5}\right) = \boxed{438\ N}$$

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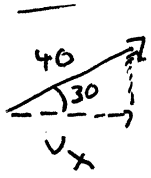
11) 

$V_y = 40\sin 30^\circ = 20\ m/s$

$V_x = 40\cos 30^\circ = 34.6\ m/s$

$V_y(t=3) = V_y(0) - gt = 20 - 9.8(3) = \boxed{-9.4\ m/s}$

$V_x(t=3) = V_x(0) + 0 \cdot t = \boxed{34.6\ m/s}$

Lands when $\Delta y = 0 \Rightarrow 0 = V_y(0)t - \frac{1}{2}gt^2 \Rightarrow t = 0$ not relevant

or $\left(V_y(0) - \frac{1}{2}gt\right)t = 0 \quad V_y(0) - \frac{1}{2}gt = 0 \quad t = \frac{2V_y(0)}{g}$ $\boxed{t = 4.08\ s}$

$\Delta x = V_x t = 34.6(4.08) = \boxed{141.2\ m}$

can also find Δt by noting that at impact $V_y(t) = -V_y(0)$

$V_y(t) = V_y(0) - gt \Rightarrow t = 4.08\ sec$

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12) $a = \frac{V_F - V_i}{t} = \frac{27.3 - 17.4}{10} = \boxed{.99\ m/s^2}$

$2a\Delta x = V_F^2 - V_i^2$

$$\Delta x = \frac{V_F^2 - V_i^2}{2a} = \frac{(27.3)^2 - (17.4)^2}{1.98} = \boxed{225\ m}$$