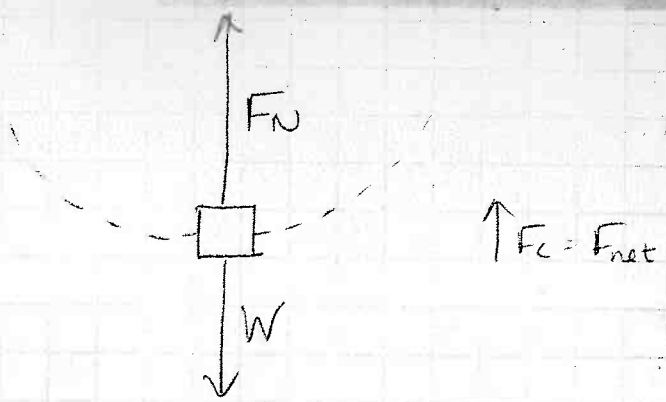
P #28

Ch 7 - pg 216

a) $m = 500\ kg$
$r_1 = 10.0\ m$
$v_t = 20.0\ m/s$



F_c is directed up

$F_c = F_{net} = F_N - W$

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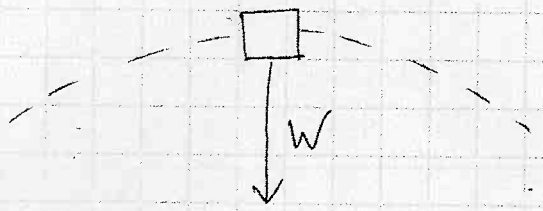
$\frac{m \cdot v_t^2}{r} = F_N - m \cdot g$

$\frac{(500\ kg)(20.0\ m/s)^2}{(10.0\ m)} = F_N - (500\ kg)(9.8\ m/s^2)$

$\boxed{F_N = 24{,}900\ N}$

b) $m = 500\ kg$
$r_2 = 15.0\ m$



F_c is directed down, and must be provided by weight

$F_c = W$

$\frac{m \cdot v_t^2}{r} = m \cdot g$

$\frac{(v_t^2)}{15.0\ m} = (9.8\ m/s^2)$

$\boxed{v_t = 12.1\ m/s}$