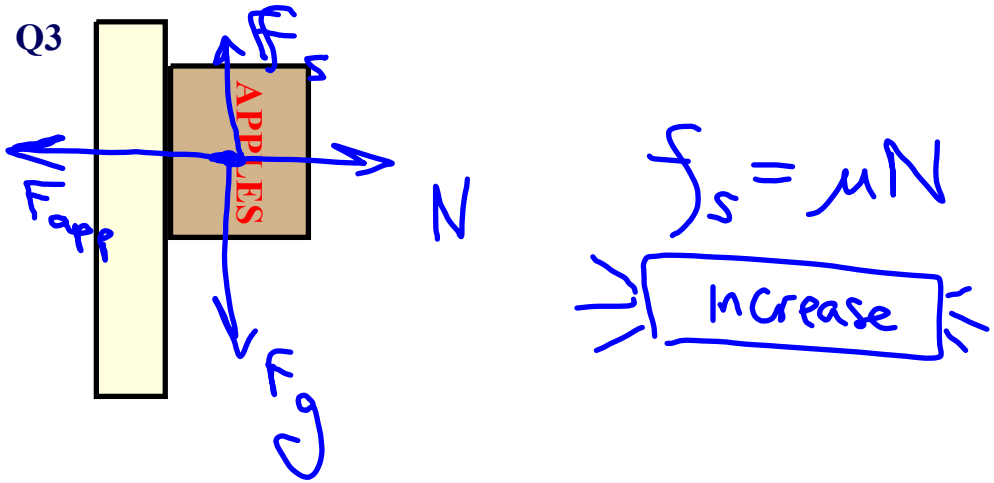
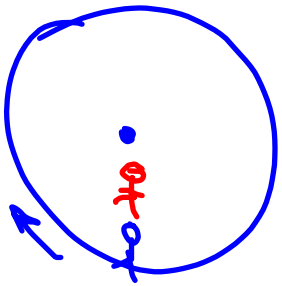
Ch6: Q3,9,12,14
P9,12,17,18,23,25,28,31,37,42,49,51,52,53,55,66,69

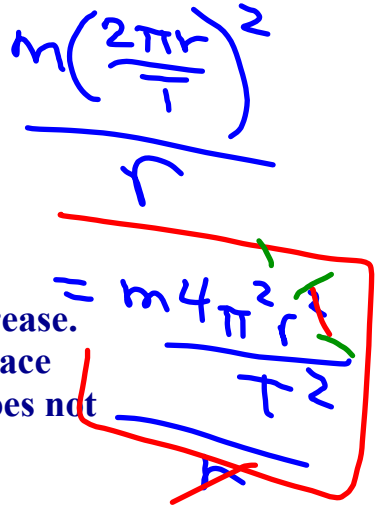
Q3



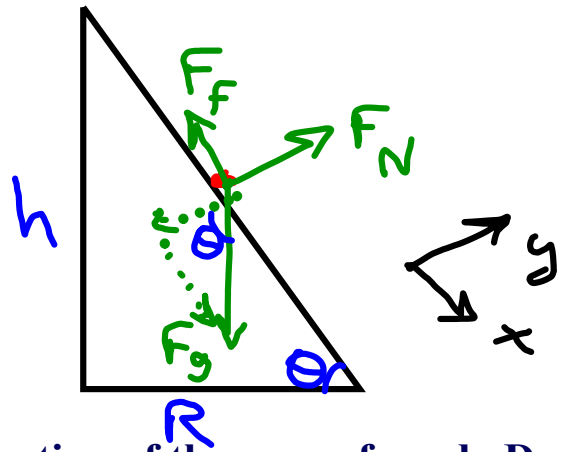
Q12 What is providing his apparent weight?



Centripetal Force = m v^2/r $\frac{mv^2}{r}$



When you come closer to the center both the r and v decrease. Note v=2pi*r/T. As you move closer to the center on a space station that has a constant angular velocity, the period does not change.
F= m 4 pi^2 r/T^2.... So F decreases directly with r.



$$V_{max} = \pi\mu\frac{R^3}{3}$$

$$V = \frac{\pi R^2 h}{3}$$

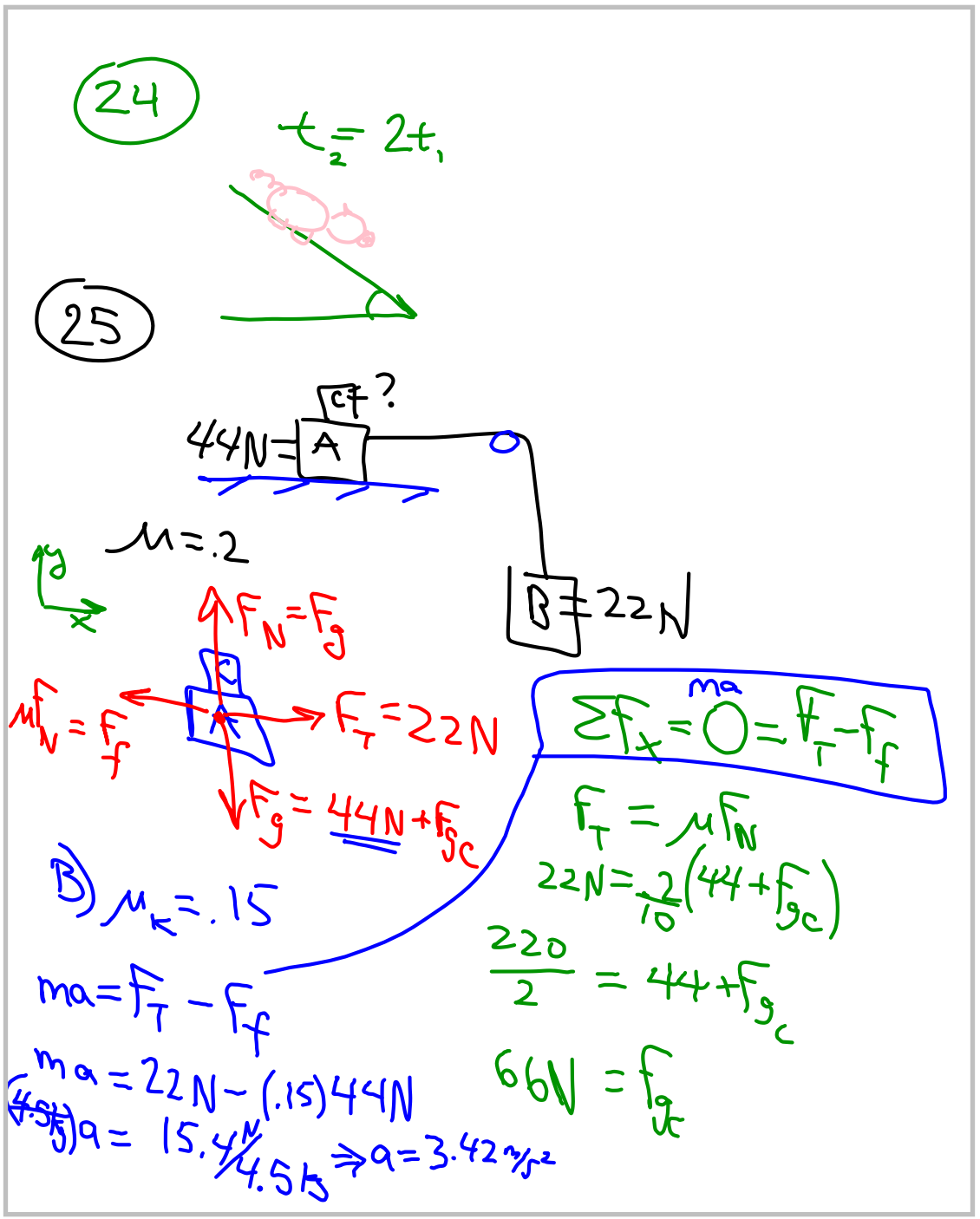
18 Draw a cross section of the cone of sand. Do a free body diagram of a grain of sand on the side of the cone. (Let x-axis be down the plane) If the grain doesn't slide, the acceleration is zero, i.e. the sum of the forces =0.

$$F_f = mg\sin\theta \qquad F_N = mg\cos\theta$$

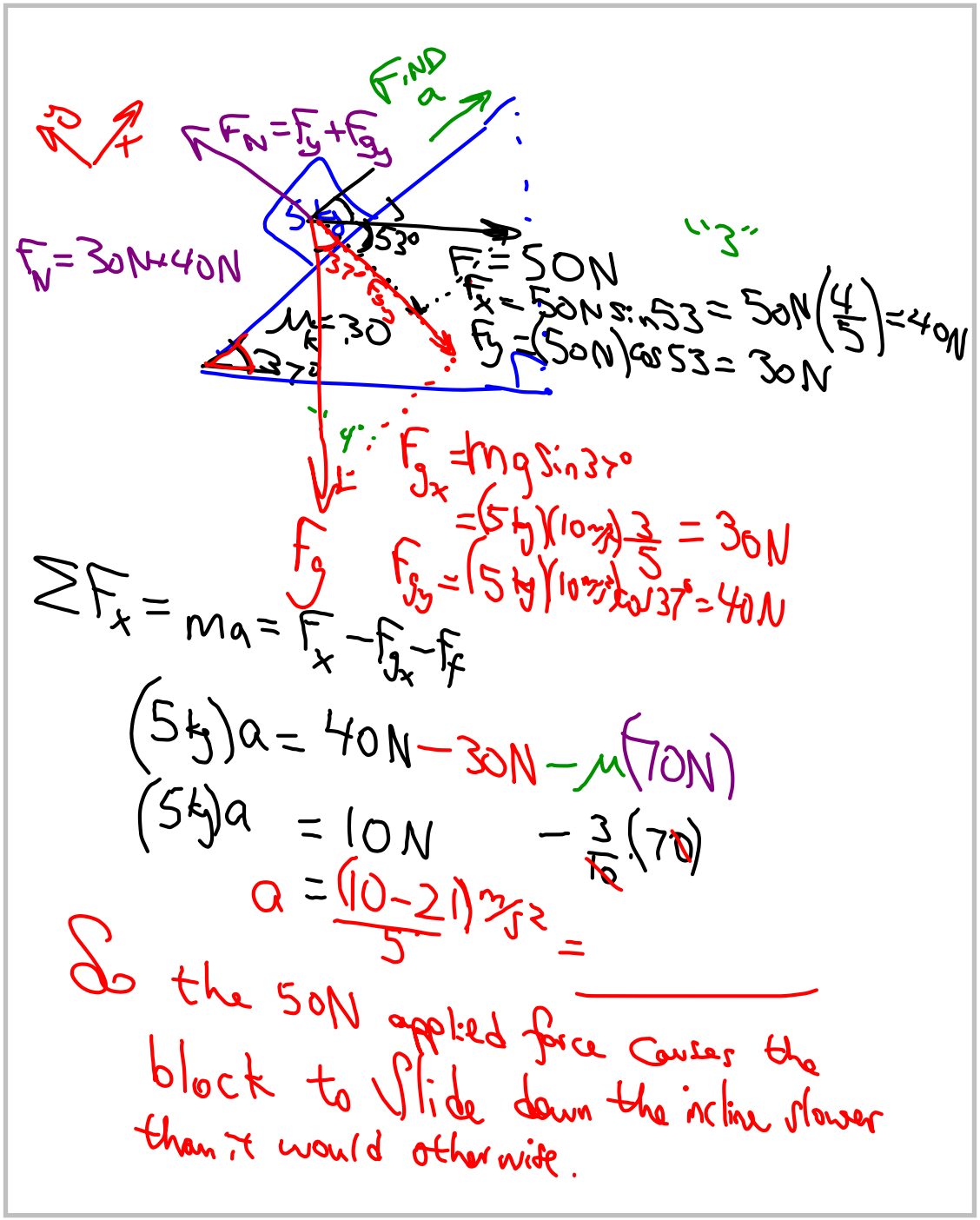
$$F_f = \mu F_N$$

$$mg\sin\theta = \mu\, mg\cos\theta$$

$$\tan\theta = \mu$$



Title: Apr 4 - 3:22 PM (3 of 4)


FIND a
$F_N = F_y + F_{gy}$
$F_N = 30N + 40N$
53°
37°
$F_1 = 50N$
$F_x = 50N \sin 53 = 50N\left(\frac{4}{5}\right) = 40N$
$F_y = (50N)\cos 53 = 30N$
"3"
$\mu_k = .30$
$F_g = mg$
$F_{gx} = mg \sin 37°$
$= (5kg)(10 m/s^2)\frac{3}{5} = 30N$
$F_{gy} = (5kg)(10 m/s^2)\cos 37° = 40N$
$\Sigma F_x = ma = F_x - F_{gx} - F_f$
$(5kg)a = 40N - 30N - \mu(70N)$
$(5kg)a = 10N - \frac{3}{7}(70)$
$a = \frac{(10-21)m/s^2}{5} =$
So the 50N applied force causes the block to slide down the incline slower than it would otherwise.