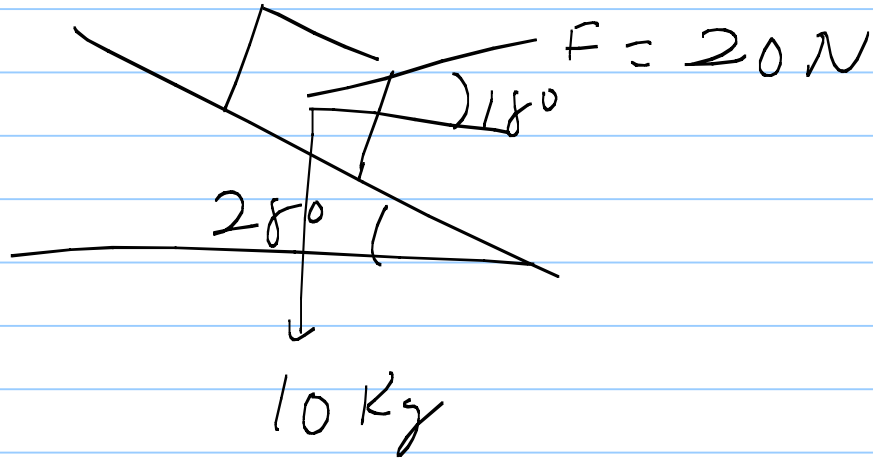
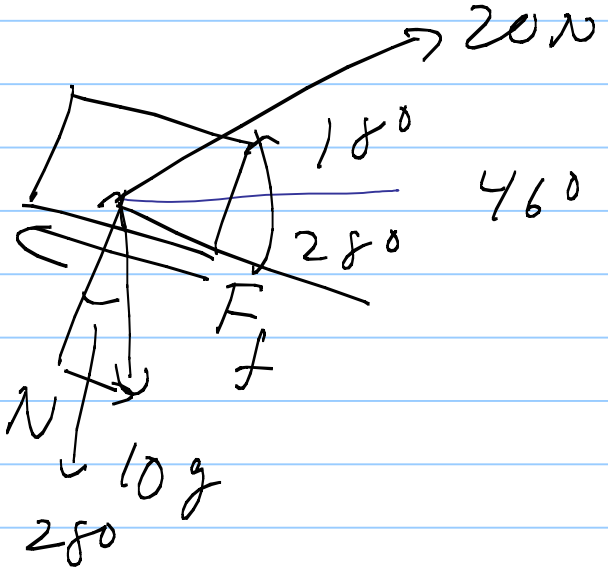
EGR 180 7/21/10

Note Title 7/21/2010

9-21





$$\sum F_N = N - 10g\cos(28) + 20\sin(46) = 0$$

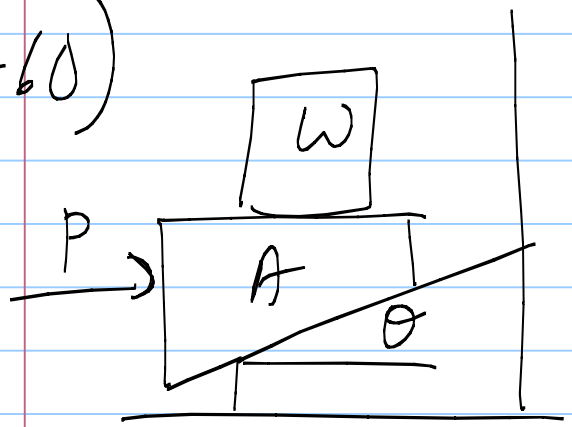
$$N = 10g\cos(28) - 20\sin(46) = 72.2\ N$$

$$\sum F_T = -F_f + 10g\sin(28) + 20\cos(46) = 0$$

$$F_f = 10g\sin(28) + 20\cos(46) = 60.0$$

$$= \mu N \Rightarrow \mu = 0.83$$

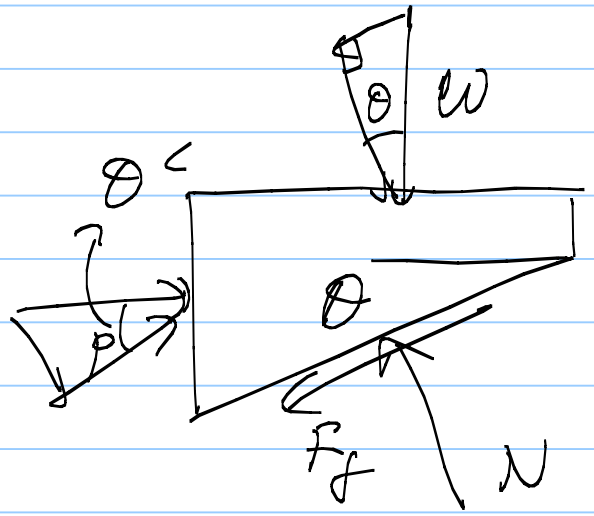
9-60)



$W = 3500\,N$

$\theta = 15°$

$\mu = 0.25$



$$\sum F_N = N - P\sin\theta - W\cos\theta = 0$$

$$\sum F_T = -F_f + P\cos\theta - W\sin\theta = 0$$

$$F_f = \mu N$$

$$P\cos\theta - \mu N = W\sin\theta$$

$$(P\sin\theta - N = -W\cos\theta) - \mu$$

$$P[\cos\theta - \mu\sin\theta] = W[\sin\theta + \mu\cos\theta]$$

$$P = \frac{W(\sin\theta + \mu\cos\theta)}{\cos\theta - \mu\sin\theta} = \frac{3000(\sin(15) + 0.25\cos(15))}{\cos(15) - .25\sin(15)}$$

$$P = 165\,N$$

$$\sin(15) - 0.25\cos(15) = 0.02$$

c) $P = 50.5\,N$

d) $\sin(\theta) - 0.25\cos(\theta) = 0$

$$\tan(\theta) = .25 \Rightarrow \theta = 14.04^{\circ}$$

9-65) $r = 0.25''$, $\mu = 0.40$, $L = 0.10''$

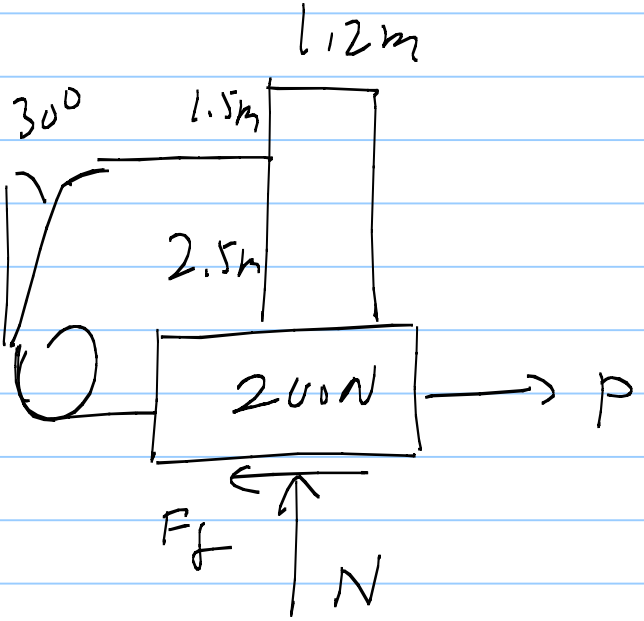
$F = 80\ lb$

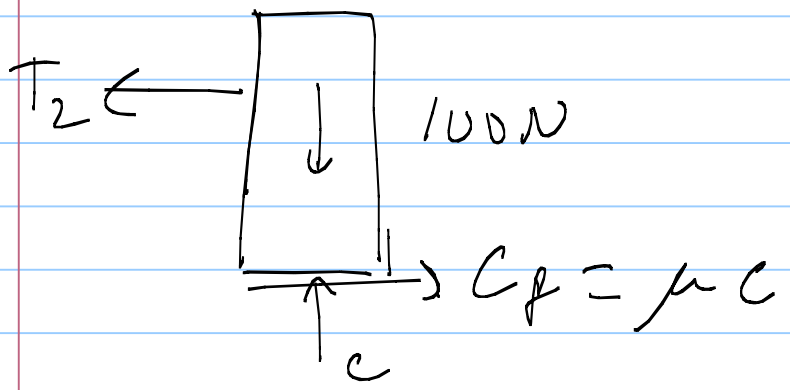
$$M = \frac{Fr[L + 2\pi r\mu]}{2\pi r - \mu L}$$

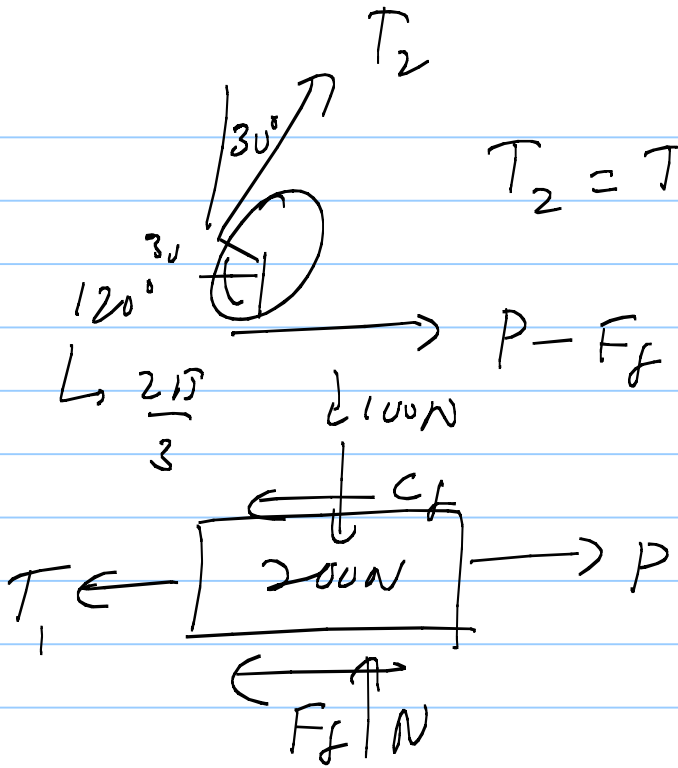
$$= \frac{(80)(.25)[.1 + .8\pi(.25)]}{.5\pi - .04} = 9.52\ in\text{-}lbs$$

$.1 - .8\pi(.25) = -.53$

9-96)







$T_1 = P - F_f - C_f$

$T_2 = (P - F_f - C_f) e^{-.2\pi}$

$P - F_f - C_f = T_2 e^{.2\pi}$

$C = 100\,N, \quad C_f = 30\,N = T_2$

$P - F_f - C_f = 30e^{.2\pi} = T_1 \Rightarrow P = 30e^{.2\pi} + 90 + 30$

$= 176.2\,N$

$N = 300\,N, \quad F_f = 90\,N$