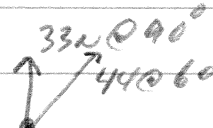


PHY 7.1A  
30, 31, 33, 34

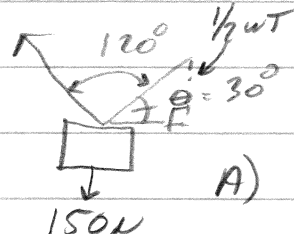
30)   $A_x = 33N \cos 90^\circ$   $A_y = 33N \sin 90^\circ$   
 $B_x = 44N \cos 60^\circ$   $B_y = 44N \sin 60^\circ$   
 $R_x = 22N$   $R_y = 71.1N$

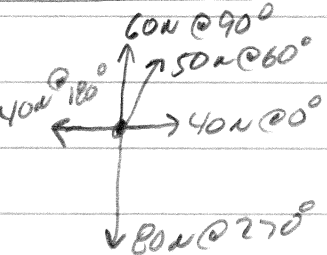
$$R = \sqrt{(22N)^2 + (71.1N)^2}$$

$$R = 74N @ 72.8^\circ$$

$$\tan^{-1}\left(\frac{71.1N}{22N}\right) = 72.8^\circ$$

$$F_0 = 74N @ 253^\circ$$

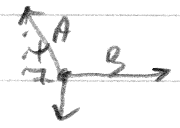
31)   $\sin \theta = \frac{opp}{hyp}$   $hyp = \frac{opp}{\sin \theta}$   
 A)  $F_T = \frac{75N}{\sin 30^\circ} = 150N$   
 B)  $F_T = \frac{75N}{\sin 45^\circ} = 106N = 110N$

33)   $A_x = 60N \cos 90^\circ$   $A_y = 60N \sin 90^\circ$   
 $B_x = 50N \cos 60^\circ$   $B_y = 50N \cos 60^\circ$   
 $C_x = 40N \cos 0^\circ$   $C_y = 40N \cos 0^\circ$   
 $D_x = 80N \cos 270^\circ$   $D_y = 80N \cos 270^\circ$   
 $E_x = 40N \cos 180^\circ$   $E_y = 40N \cos 180^\circ$

$$R = \sqrt{(25N)^2 + (23.3N)^2} = 34.0N \quad R_x = 25N \quad R_y = 23.3N$$

$$\tan^{-1}\left(\frac{23.3N}{25N}\right) = 42.9^\circ$$

$$F_0 = 34N @ 223^\circ$$

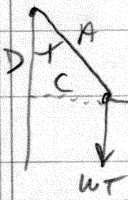
34)   $\theta = 30^\circ$   
 $7.5 \times 10^2 N$

$$\tan \theta = \frac{opp}{adj} \quad opp = adj \tan \theta$$

$$B = (7.50 \times 10^2 N) (\tan 30^\circ) = 433N$$

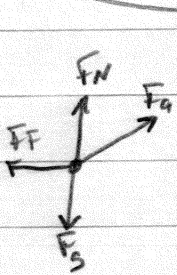
Phy 7.1 HW  
34 → 38

34)  $WT = 7.50 \times 10^2$   
 $\theta = 30.0^\circ$



$F_{TB} = F_{TC}$   $F_D = WT$   $\tan \theta = \frac{a}{b}$

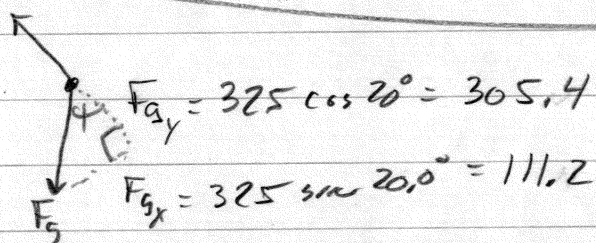
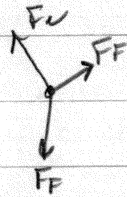
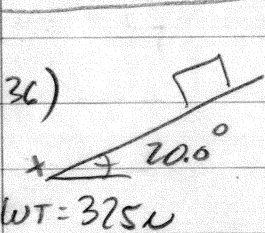
$F_{TB} = F_{TC} = a \tan \theta = 7.50 \times 10^2 \text{ N} \tan 30.0^\circ = 433 \text{ N}$



35)  $V = \text{Constant}$   
 $m = 18 \text{ kg}$   
 $F_a = 43 \text{ N}$   
 $F_F = 27 \text{ N}$   
a)  $F_F = F_{a_y} = 27 \text{ N}$   $\cos \theta = \frac{a}{h}$   $\theta = \cos^{-1} \frac{a}{h} = \cos^{-1} \left( \frac{27 \text{ N}}{43 \text{ N}} \right) = 51^\circ$

b)  $F_N = F_G - F_{a_y} = mg + F_{a_y} = (18 \text{ kg})(9.80 \text{ m/s}^2) - (43 \text{ N} \sin 51^\circ) = 140 \text{ N}$

c)  $\mu F_N = F_F$   $\mu = \frac{F_F}{F_N} = \frac{27 \text{ N}}{140 \text{ N}} = .19$



$F_{Gy} = 325 \cos 20^\circ = 305.4$

$F_{Gx} = 325 \sin 20^\circ = 111.2$

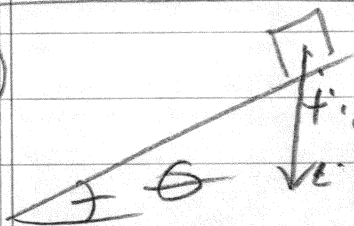
$F_F = F_a = 211 \text{ N}$  a)  $F_{Gx} = 111 \text{ N}$

$V = \text{Constant}$  b)  $\Sigma F_x = 0$  because  $v$  is constant

c)  $F_{Gx} + F_F = F_a$   $F_F = F_a - F_{Gx} = 211 \text{ N} - 111 \text{ N} = 1.00 \times 10^2 \text{ N}$  (down plane)

d)  $\mu = \frac{F_F}{F_N} = \frac{F_F}{F_{Gy}} = \frac{1.00 \times 10^2 \text{ N}}{305 \text{ N}} = .329$

37)



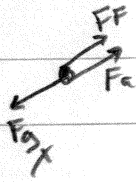
$WT = F_G = 215 \text{ N}$

$F_{Gx} = 123 \text{ N}$

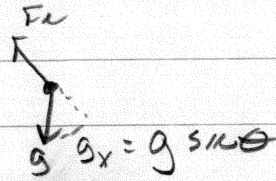
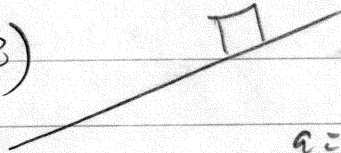
$\theta = 35.0^\circ$

$F_{Gx} = ?$

37)  $F_a + F_f = F_{g_x}$      $F_a = F_{g_x} - F_f = 111N - 100N = 11.0N$  up plane



38)



$a_x = 9.80 \text{ m/s}^2 \sin 25^\circ = 4.14 \text{ m/s}^2 = 4.1 \text{ m/s}^2$

$m = 2.5 \text{ kg}$

$\theta = 25.0^\circ$

a)  $v^2 = v_0^2 + 2a\Delta d$      $a = \frac{v^2 - v_0^2}{2\Delta d} = \frac{(0.65 \text{ m/s})^2 - 0 \text{ m/s}^2}{2(1.6 \text{ m})} = .132 \text{ m/s}^2 = .13 \text{ m/s}^2$

$v_0 = 0$

$v = .65 \text{ m/s}$

b)  $a = a_{g_x} - a_f$      $a_f = a_{g_x} - a = 4.14 \text{ m/s}^2 - .132 \text{ m/s}^2 = 4.008 \text{ m/s}^2$

$L = 1.6 \text{ m}$

$\mu = \frac{F_f}{F_N} = \frac{ma}{mg \cos \theta} = \frac{4.008 \text{ m/s}^2}{9.80 \text{ m/s}^2 \cos 25^\circ} = .4512 = .45$

c) MASS CANCELS OUT IN EQUATION