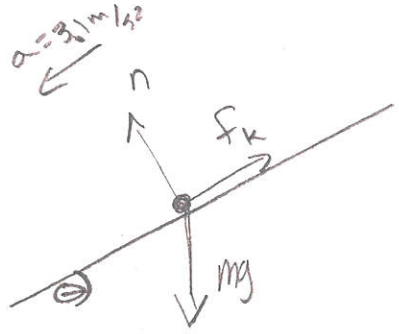
1. 

$\theta = 26°$

$a = 3.1 m/s^2$

$\Sigma F_y = 0$

$n = mg_y$

$n = mg\cos\theta$

$\Sigma F_x = ma$

$mg_x - f_k = ma$

$mg\sin\theta - \mu_k n = ma$

$mg\sin\theta - \mu_k mg\cos\theta = ma$

$\mu_k = \frac{g\sin\theta - a}{g\cos\theta}$

$\mu_k = \frac{9.81\sin 26 - 3.1}{9.8\cos 26}$

$= 0.136$

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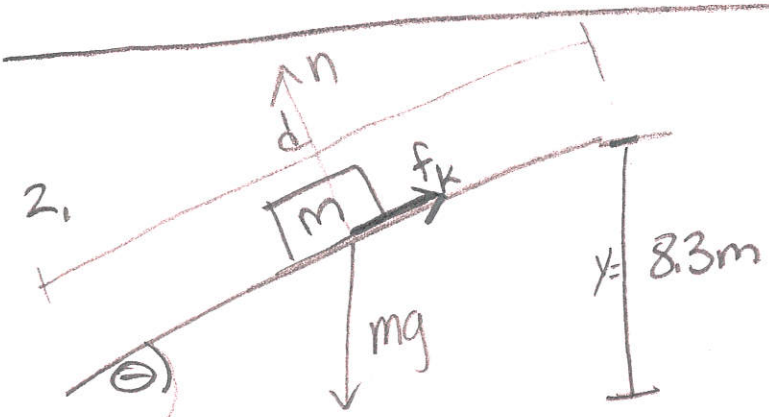
2. 

$m = 3.4 kg$

$\mu = 0.28$

$\theta = 32°$

$\sin\theta = \frac{y}{d}$

$d = \frac{y}{\sin\theta}$

$d = 15.66m$

$\Sigma F_y = 0$

$n = mg_y$

$n = mg\cos\theta$

$\Sigma F_x = 0$

$mg_x - f_k = ma$

$mg\sin\theta - \mu n = ma$

$mg\sin\theta - \mu mg\cos\theta = ma$

$g\sin\theta - \mu g\cos\theta = a$

$9.8\sin 32 - 0.28(9.8)\cos 32 = a$

$2.87 \frac{m}{s^2} = a$

$V_0 = 0$

$\Delta d = 15.66m$

$V_f = ?$

$a =$ must find $= 2.87 m/s^2$

$V_f^2 = V_0^2 + 2a\Delta d$

$V_f = \sqrt{2a\Delta d}$

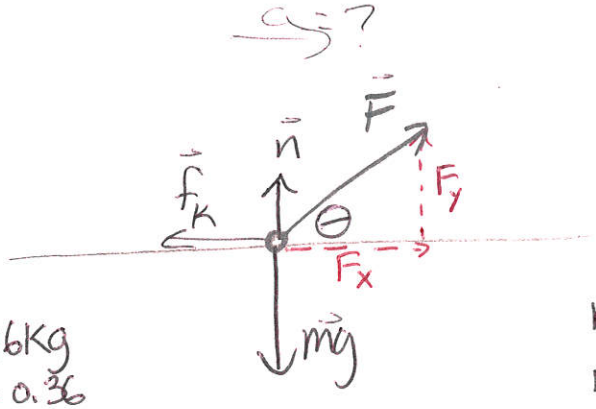
$= \sqrt{2(2.87)(15.66)}$

$= 9.48 m/s$

max

$f_s = \mu_s n$

3.



$m = 16kg$
$\mu_k = 0.36$
$\theta = 59°$
$F = 93.4$
$a = ?$

$\Sigma F_y = 0$

$n + F_y = mg$

$n + F\sin\theta = mg$

$n = mg - F\sin\theta$

$n = 76.74$

$\Sigma F_x = ma$

$F_x - F_k = ma$

$F\cos\theta - \mu_k n = ma$

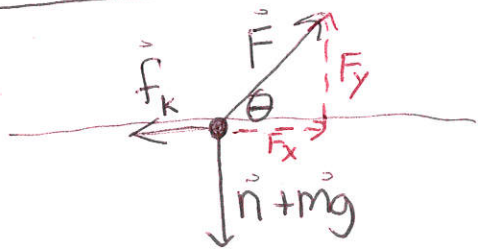
$\frac{F\cos\theta - \mu_k n}{m} = a$

$\frac{48.1 \quad 0.36 \quad 76.74}{F\cos\theta - \mu_k(mg - F\sin\theta)} = a$

m

$1.28 m/s^2 = a$

4.



$F = 460N$
$\theta = 58°$
$a = 7.2 m/s^2$
$m = 24kg$
$\mu_k = ?$

$\Sigma F_y = 0$

$F_y = n + mg$

$n = F_y - mg$

$n = F\sin\theta - mg$ (460, 58, 24, 9.8)

$n = 154.9N$

$\Sigma F_x = ma$

$F_x - F_k = ma$

$F\cos\theta - \mu_k n = ma$

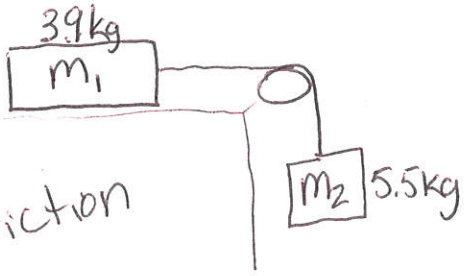
$F\cos\theta - ma = \mu_k n$

$\mu_k = \frac{F\cos\theta - ma}{n}$

$\mu_k = \frac{F\cos\theta - ma}{F\sin\theta - mg}$ (460, 58, 24, 7.2; 154.9)

$\mu_k = 0.458$

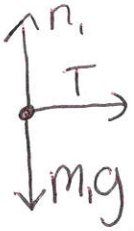
5.



no friction

$a = ?$

((since string doesn't stretch accel. is same ~~bo~~ for both blocks



$\Sigma F_y = 0$ $\quad n_1 = m_1 g$

$\Sigma F_x = m_1 a$ $\quad T = m_1 a$

$\Sigma F_y = m_2 a$ $\quad m_2 g - T = m_2 a$

SINCE PULLEY HAS NO ROT. INERTIA AND ROPE IS T IS SAME THROUGHOUT

add these two equations (or substitute for T)

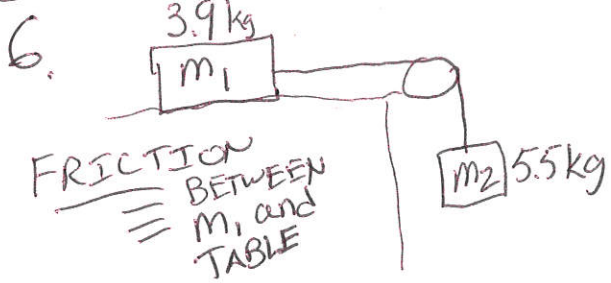
$m_2 g = m_1 a + m_2 a$

$m_2 g = a(m_1 + m_2)$

$\frac{m_2 g}{m_1 + m_2} = a$ (5.5, 9.8 / 3.9, 5.5)

$a = 5.73\ m/s^2$

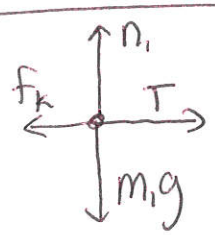
6.



FRICTION BETWEEN m_1 and TABLE

$\mu_k = ?$

$a = 4.5\ m/s^2$



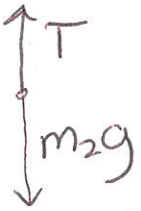
$\Sigma F_y = 0$ $\quad n_1 = m_1 g$

$\Sigma F_x = m_1 a$

$T - f_k = m_1 a$

$T - \mu_k n = m_1 a$

$T - \mu_k m_1 g = m_1 a$



TENSION SAME SAME STILL

$\Sigma F_y = m_2 a$

$m_2 g - T = m_2 a$

$T = m_2 g - m_2 a$

$T = 29.15\ N$

COMBINE THESE TWO OR USING $T = m_2 g - m_2 a$ Find value of Tension first then subst.

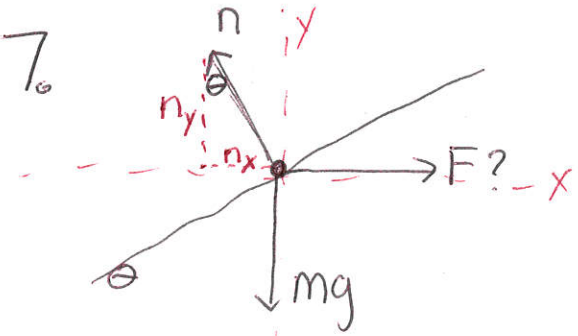
$m_2 g - \mu_k m_1 g = m_1 a + m_2 a$

$m_2 g - m_1 a - m_2 a = \mu_k m_1 g$

$\frac{m_2 g - m_1 a - m_2 a}{m_1 g} = \mu_k$

$\mu_k = 0.304$

7.



$m = 4.6\,kg$
$\theta = 23°$
$F = ?$

SINCE THERE IS NO ACCEL.... MIGHT BE EASIER TO GO WITH STANDARD FRAME OF REFERENCE... SO YOU would ONLY HAVE TO BREAK UP THE NORMAL FORCE

$\Sigma F_y = 0$

$n_y = mg$

$n\cos\theta = mg$

$n = \frac{mg}{\cos\theta}$

$\Sigma F_x = 0$

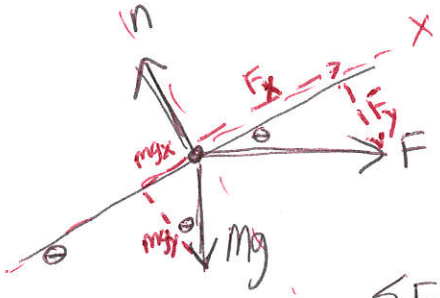
$F = n_x$

$F = n\sin\theta$

$F = \frac{mg}{\cos\theta}\cdot\sin\theta$ ← yes, this equals $mg\tan\theta$

$= 19.1\,N$

8.



ACCEL WILL BE ALONG THE SLOPE... SO I WILL MAKE THE X-AXIS BE PARALLEL TO THE SLOPE... YOU CAN TRY IT THE OTHER WAY TO SEE IF IT IS EASIER...

$m = 2.1\,kg$
$F = 28N$
$\theta = 26°$
$a = ?$

$\Sigma F_y = 0$

$n = mg_y + F_y$

$\Sigma F_x = ma$

$F_x - mg_x = ma$

$F\cos\theta - mg\sin\theta = ma$

$\frac{F\cos\theta - mg\sin\theta}{m} = a$

$a = \frac{28\cos 26 - 2.1(9.8)\sin 26}{2.1}$

$7.69\,m/s^2$