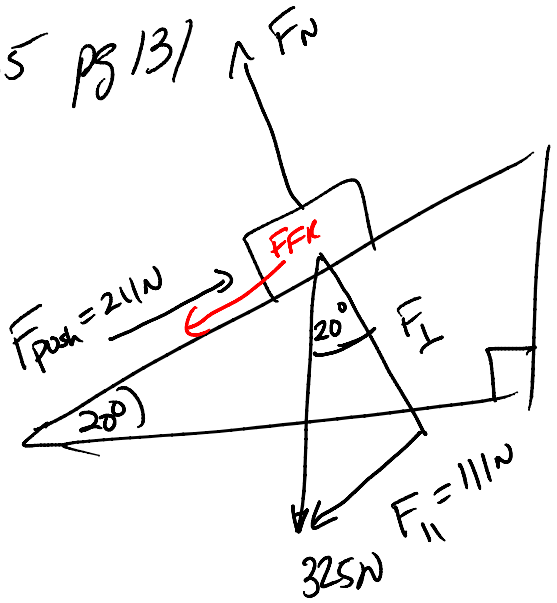
October-19-10
12:54 PM

#35 pg 131



trunk is moving constant v

Since a = 0

$F_{NET}=0$

a) $F_{||} = 325\,N \sin 20° = 111\,N$

b) 0 because $a = 0$ so, $F_{NET} = 0$

c) Since $F_{NET} = F_{push} + F_{FR} + F_{||}$

$0 = 211\,N + F_{FR} + (-111N)$

$F_{FR} = -100\,N$

d) $\mu_K = ?$ $\quad F_{FR} = \mu_K F_N$

$F_N = 325 \cos 20 = 305$

$$\mu_K = \frac{F_{FR}}{F_N} = \frac{100\,N}{305} = \boxed{0.33}$$

Remember $0 < \mu_K < 1$

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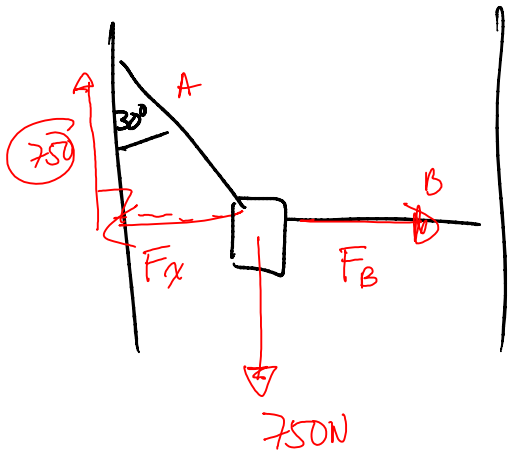
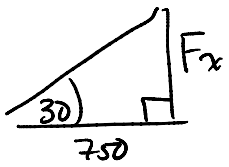


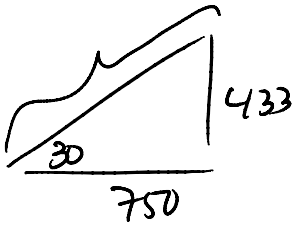


$\tan 30° = \frac{F_x}{750}$

$F_x = -433$

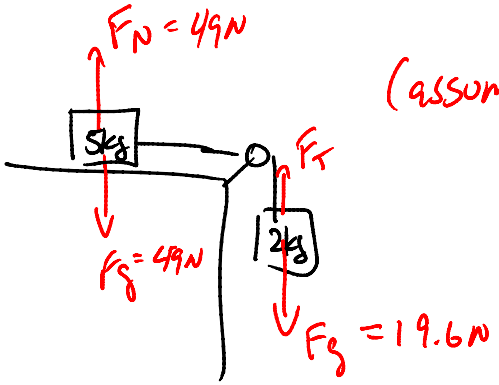
$F_B = 433$

$F_A = 866$



Tension Problems

ex)

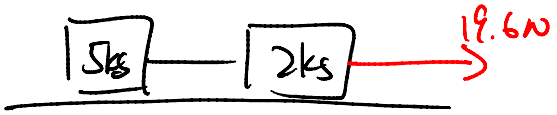


(assume frictionless)

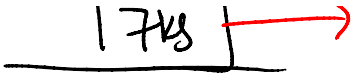
label FBD

Free body diagram

Lets consider as if it was horizontal



19.6N

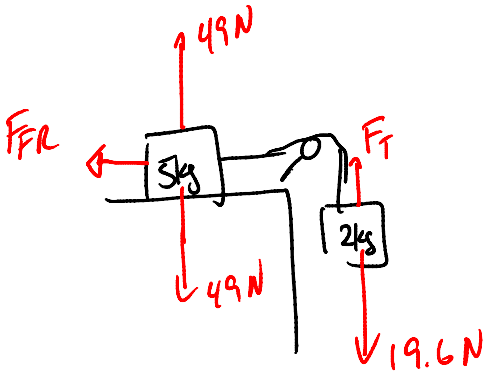
assume 

$a = 2.8 \frac{m}{s^2}$

What is the "a" for 2kg block $a = -2.8 m/s^2$

"a" for 5kg " $a = 2.8 \frac{m}{s^2}$

ex) Now assume friction exists $\mu_k = 0.20$

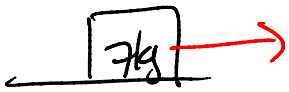


find "a", first do FBD

$F_{FR} = \mu_k F_N$

$= (0.20)(49N)$

assume 

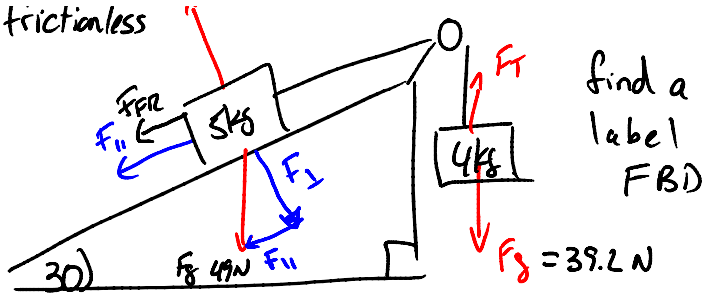


$9.8N = F_{NET}$

find a

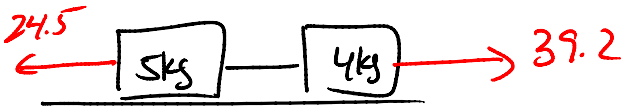
$a = 1.4 m/s^2$

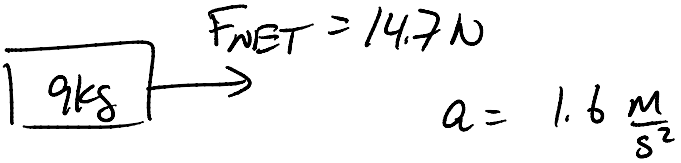
Ex assume frictionless



find a
label
FBD

$F_{||} = 49N \sin 30$
$= 24.5N$





Same problem as before, find μ_k so that we are in equilibrium

$\therefore a = 0$

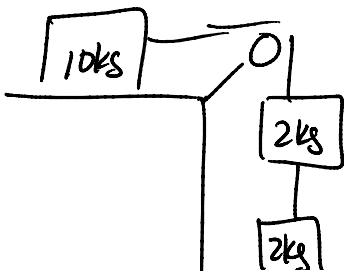
$\therefore F_{NET} = 0$

$\therefore F_{FR} = 14.7N$

$F_N = 49 \cos 30 = 42.4N$

$\mu_k = \frac{F_{FR}}{F_N} = 0.36$

Ex given



assume frictionless
find a

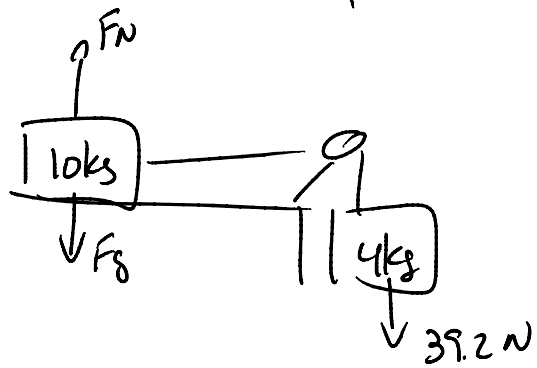
Now assume $\mu_k = .20$

2kg

Now assume $\mu_k = .20$

find a

a)

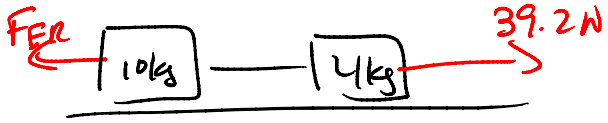


$a = 2.8 m/s^2$

$F_{NET} = ma$

$a = \frac{F_{NET}}{m} = \frac{39.2N}{14kg} = 2.8 m/s^2$

b)

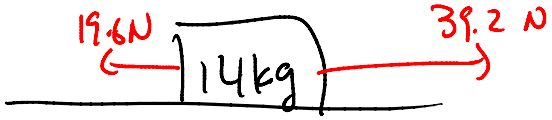


$F_N = 98N$

$F_{FR} = \mu_k \cdot F_N$

$= (.20)(98N)$

$= 19.6\ N$



$F_{NET} = 19.6N$

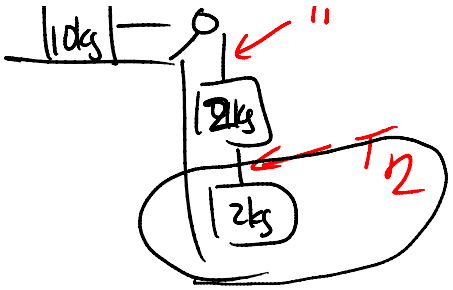
$a = \frac{F_{NET}}{m} = \frac{19.6}{14kg} = 1.4 \frac{m}{s^2}$

Review calculating Tension forces

Recall

Find T_1

Recall

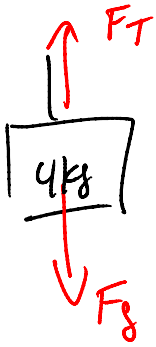


Find T_2

assume frictionless

$a = 2.8 \frac{m}{s^2}$ ∴ The 2kg blocks have "a" = $-2.8 \frac{m}{s^2}$

imagine as if it were an elevator problem



$a = -2.8 m/s^2$

$F_{NET} = -11.2 N$

$F_{NET} = F_T + F_g$

$F_T = F_{NET} - F_g$

$= (-11.2 N) - (4kg)(-9.8 \frac{m}{s^2})$

$= 28N$

Finding T_2

$a = -2.8 m/s^2$

$F_{NET} = -5.6 N$

$F_{NET} = F_T + F_g$

$F_T = F_{Net} - F_g$

$= (-5.6\,N) - (2kg)(-9.8\,N)$

$= 14N$