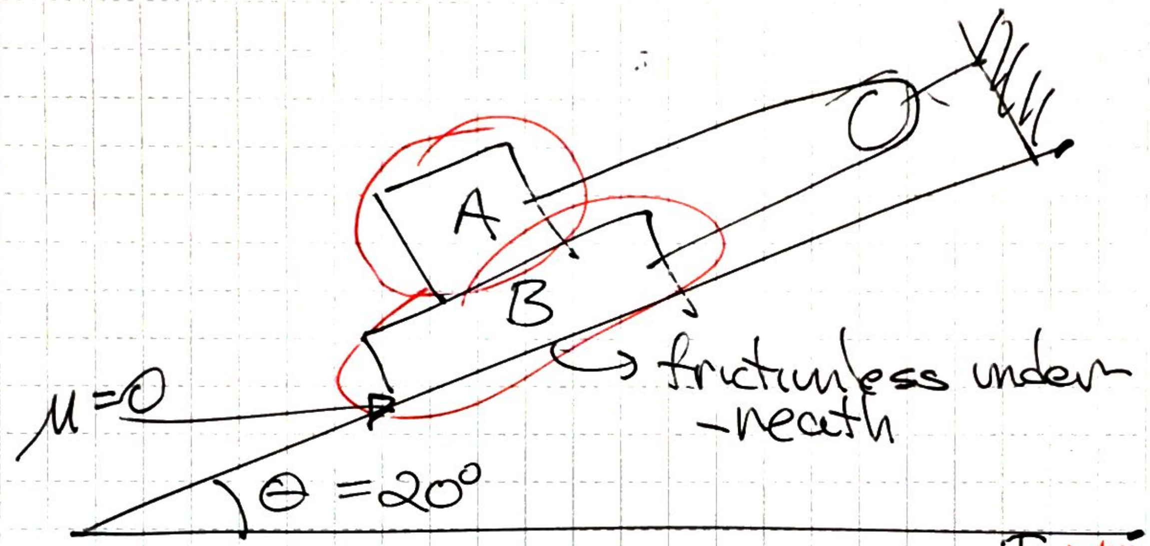
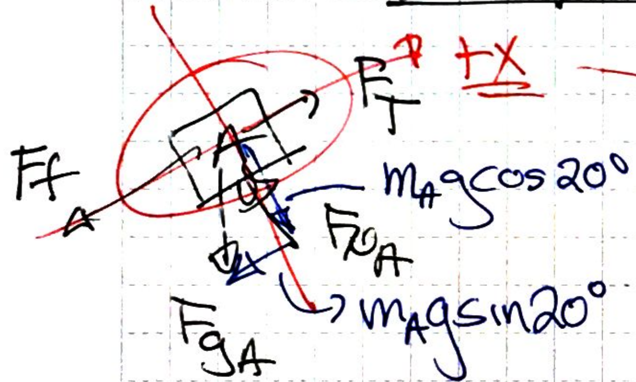


$m_B = 8\,kg$

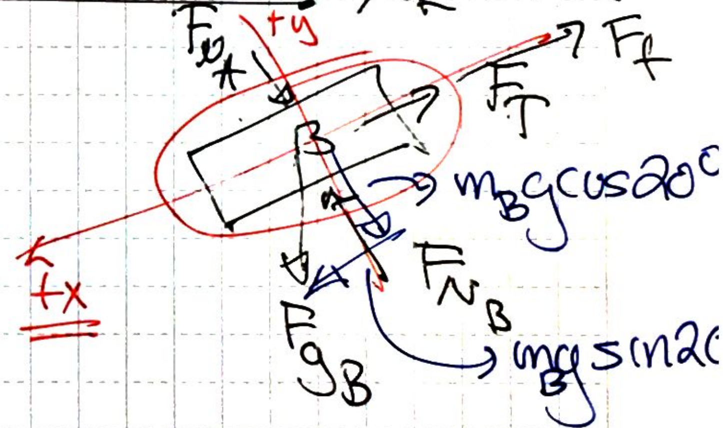
$m_A = 4\,kg$

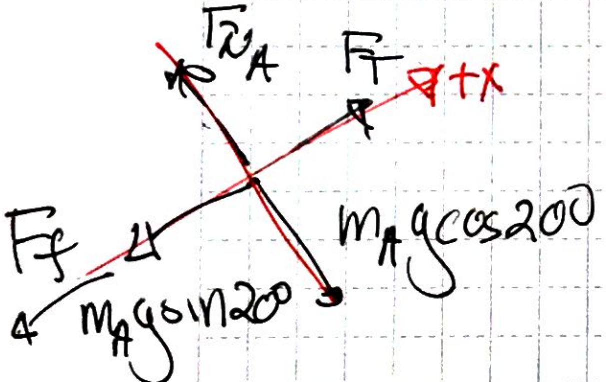
$\mu_s = .4$

$\mu_k = .2$

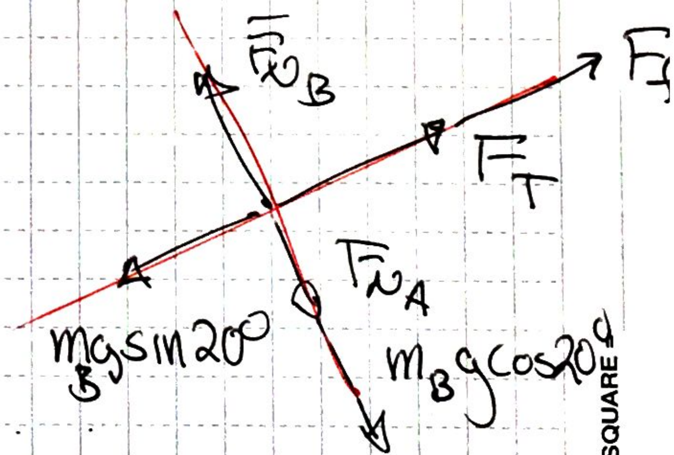


consistency!





	x	y
F_T	F_T	0
F_{N_A}	0	F_{N_A}
F_g	$-m_A g \sin 20$	$-m_A g \cos 20^\circ$
F_f	$-F_f$	0
ma	$m_A a_x$	0



1 SQUARE

$$F_T - m_A g \sin 20^\circ - F_f = m_A a_x$$

$$F_{N_A} - m_A g \cos 20^\circ = 0$$

$$F_f \le \mu_s F_{N_A}$$

$$= \mu_k F_{N_A}$$

Assume in motion:

$$\Rightarrow a_x \neq 0$$

$$F_f = \mu_k F_N = .2(F_{N_A})$$

$$\Rightarrow F_{N_A} = m_A g \cos 20^\circ = 37.6N$$

$$\Rightarrow F_f = .2(37.6N) = 7.52N$$

$$\Rightarrow F_T - \underbrace{m_A g \sin 20^\circ}_{13.6N} - 7.52N = m_A a_x$$

$$F_T - 21.1N = 4kg\, a_x$$

	x	y
F_{N_A}	0	$-F_{N_A}$
F_{N_B}	0	F_{N_B}
F_{g_B}	$m_B g \sin 20^\circ$	$-m_B g \cos 20^\circ$
F_f	$-F_f$	0
F_T	$-F_T$	0
$m_B a$	$m_B a_x$	0

$$-F_{N_A} + F_{N_B} - m_B g \cos 20^\circ = 0$$

$$\underbrace{m_B g \sin 20^\circ}_{27.4N} - F_f - F_T = m_B a_x$$

$$27.4N - 7.5N - F_T = 8kg\, a$$

$$19.9N - [4kg\, a_x + 21.1N] = 8$$

$$41N = 12kg\, a_x$$

$$a_x = \frac{41N}{12kg} = \underline{3.42 \, m/s^2}$$

$$F_T - 21.1\,N = 4\,kg\left[3.42\,m/s^2\right]$$

$$F_T = 21.1\,N + 13.67\,N$$

$$\boxed{F_T = 34.77\,N}$$

Everything is known!

$$-F_{N_A} + F_{N_B} - m_B g\cos 20^\circ = 0$$

$$-37.6\,N + F_{N_B} - \underbrace{80\,N\cos 20^\circ}_{75.2\,N} = 0$$

$$F_{N_B} = 75.2\,N + 37.6\,N$$

$$\boxed{F_{N_B} = 112.8\,N}$$