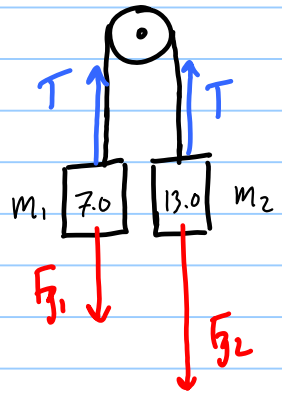
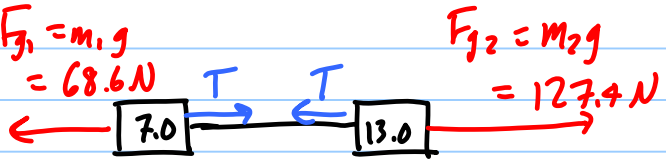
Note Title 26/01/2010

1.)





$F_{net} = F_{g2} - F_{g1} = m_t a$

$a = \frac{F_{g2} - F_{g1}}{m_t} = \frac{(127.4 - 68.6)\,N}{(7.0 + 13.0)\,kg}$

$= \boxed{2.94\ m/s^2}$

a.) $a_1 = 2.94\ m/s^2$ up

b.) $a_2 = 2.94\ m/s^2$ down

c.) m_1

$F_{net} = T - F_{g1} = m_1 a \quad T = F_{g1} + ma = 68.6N + (7.0kg)(2.94\ m/s^2)$

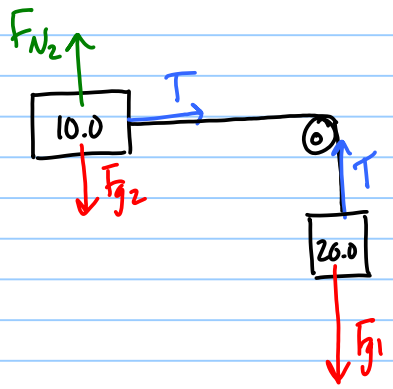
$= \boxed{89\ N}$

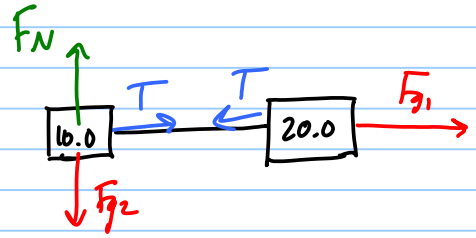
d.) m_2

$F_{net} = F_{g2} - T = m_2 a \quad T = F_{g2} - m_2 a = 127.4N - (13.0kg)(2.94\ m/s^2)$

$= \boxed{89\ N}$

2.)





$F_{g_1} = m_1 g$

$= (20.0\,kg)(9.80\,m/s^2)$

$= 196\,N$

a.) $F_{net} = F_{g_1} = m_t a$

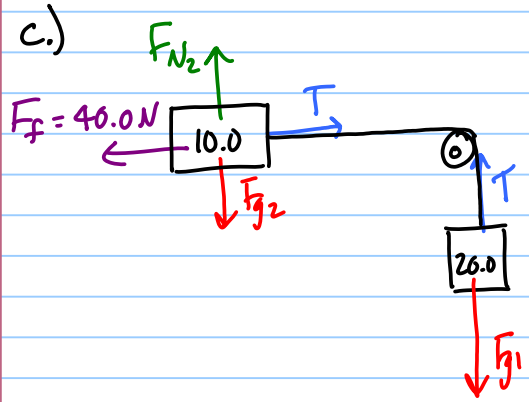
$a = \frac{F_{g_1}}{m_t} = \frac{196\,N}{(20.0+10.0)\,kg} = \boxed{6.53\,m/s^2}$

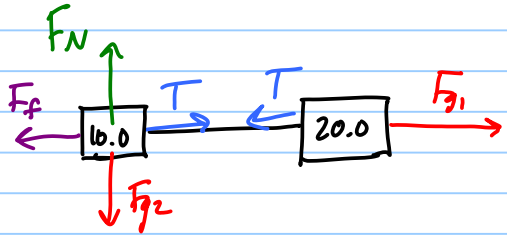
b.) m_2

$F_{net} = T = m_2 a = (10.0\,kg)(6.53\,m/s^2)$

$= \boxed{65.3\,N}$

c.)





$F_{net} = F_{g_1} - F_f = m_t a$

$a = \frac{F_{g_1} - F_f}{m_t} = \frac{(196 - 40.0)\,N}{(20.0+10.0)\,kg} = \boxed{5.2\,m/s^2}$

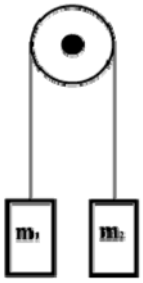
d.) m_2

$F_{net} = T - F_f = m_2 a$

$T = m_2 a + F_f = (10.0\,kg)(5.2\,m/s^2) + 40.0\,N = \boxed{92\,N}$

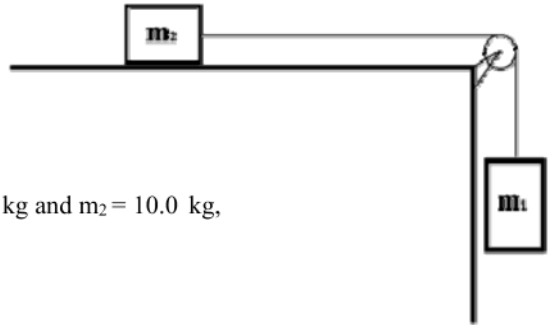
Worksheet 5.5 - Tension Worksheet

1) Two masses are connected by a rope over a pulley as shown:
$m_1 = 7.0$ kg and $m_2 = 13.0$ kg



a) What is the acceleration of m_1?
b) What is the acceleration of m_2?
c) What is the tension in the rope on m_1?
d) What is the tension in the rope on m_2?

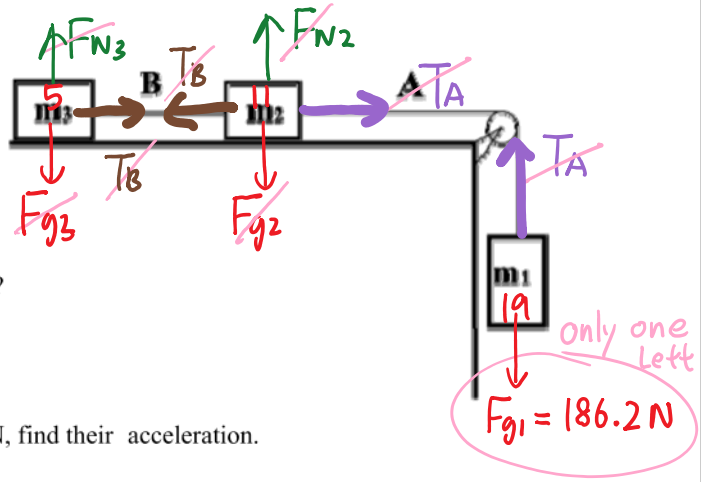
2) Two masses are attached by a string as shown:



If $m_1 = 20.0$ kg and $m_2 = 10.0$ kg,

a) Determine the acceleration of m_2 assuming that the table is frictionless.
b) Find the tension in the rope (no friction).
c) Determine the acceleration there is a force of friction of 40.0 N.
d) Find the tension on the rope (yes friction).

3) Three masses are attached as follows, assuming no friction force:
$m_1 = 19.0$ kg, $m_2 = 11.0$ kg, $m_3 = 5.0$ kg



a) What is the acceleration of the blocks?
b) What is the tension in the string at point A?
c) What is the tension in the string at point B?

4) Look at the diagram from question 3.
If the F_f on m_2 is 35 N and the F_f on m_3 is 18 N, find their acceleration.

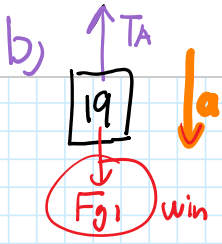
3

a) $F_{net_{sys}} = F_{g1} = Ma$

$186.2 = (19+11+5)a$

$a = 5.32\ m/s^2$ [Down for m_1]

b)



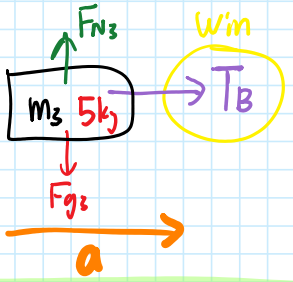
$F_{net} = F_{g1} - T_A$

$m_1 a = 186.2 - T_A$

$19(5.32) = 186.2 - T_A$

$\therefore T_A = 85.12$ N

c)



$F_{net} = T_B$

$m_3 a = T_B$

$(5)(5.32) = T_B$

$\therefore$ $T_B = 26.6\,N$

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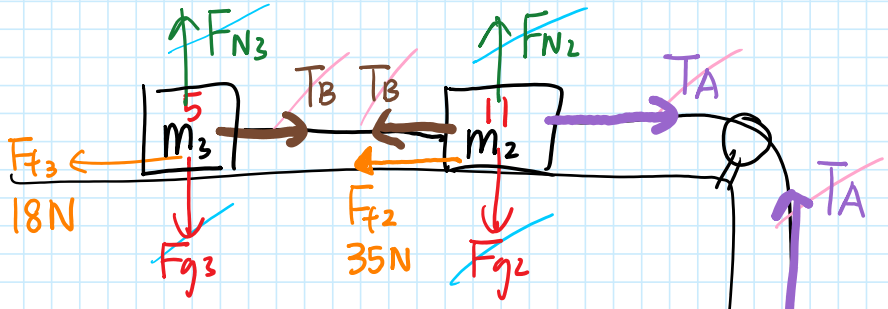
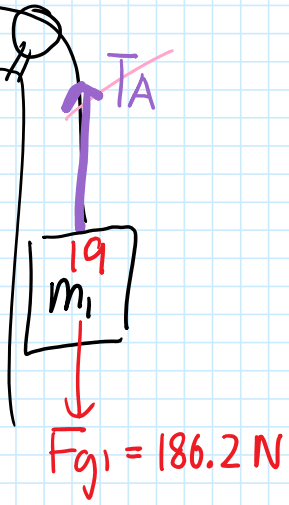
4)





* only 3 Forces left

$F_{net_{sys}} = F_{g_1} - F_{f_2} - F_{f_3}$

$Ma = 186.2 - 35 - 18$

$(19+11+5)\,a = 133.2$

$a = 3.81\ m/s^2$