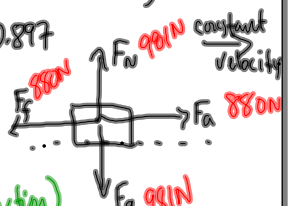
Quiz

1 1.5×10^3 N
2 54.4 kg $F_g = mg$
3 1.87 m/s²

4 7.4 N
5 1.0×10^4 N / 9.4×10^3 N $f_f = \mu F_N$
6 0.9
or 0.897



Newton's Third Law (Action-Reaction)

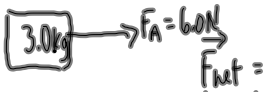
For every action force on object B due to object A, there is a reaction force, equal in magnitude but opposite in direction, due to object B acting back on object A:

$$\vec{F}_{A \text{ on } B} = -\vec{F}_{B \text{ on } A}$$

Example

What force must each of the strings be able to withstand?

To find acceleration:



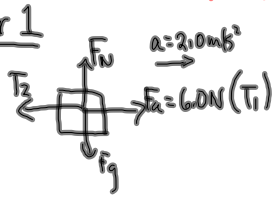
$F_{net} = m\vec{a}$

$(6.0\text{N}) = (3.0\text{kg})a$

$a = 2.0 \text{ m/s}^2$

each car has the same acc

Car 1



$\vec{F}_{net} = m\vec{a}$

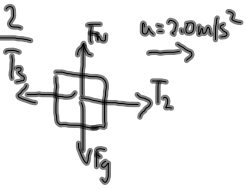
$T_1 - T_2 = ma$

$6.0\text{N} - T_2 = (0.5\text{kg})(2.0\text{m/s}^2)$

$6.0\text{N} - T_2 = 1.0\text{N}$

$T_2 = 5.0\text{N}$

Cart 2



$\vec{F}_{net} = m\vec{a}$

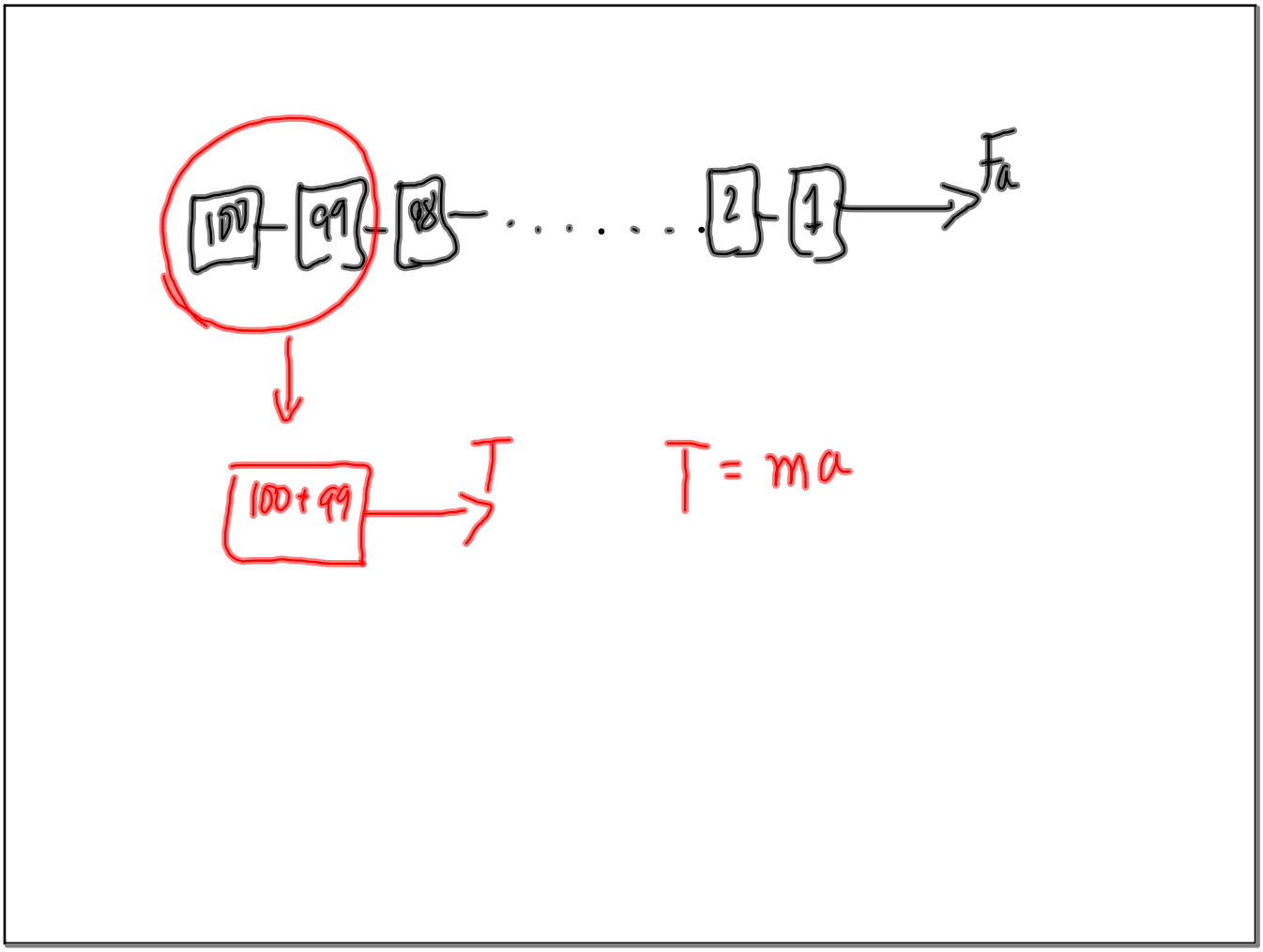
$T_2 - T_3 = ma$

$5.0\text{N} - T_3 = (1.5\text{kg})(2.0\text{m/s}^2)$

$5.0\text{N} - T_3 = 3.0\text{N}$

$T_3 = 2.0\text{N}$

Final Answer:
$T_1 = 6.0\text{N}$
$T_2 = 5.0\text{N}$
$T_3 = 2.0\text{N}$



Nov 2-12:37 PM

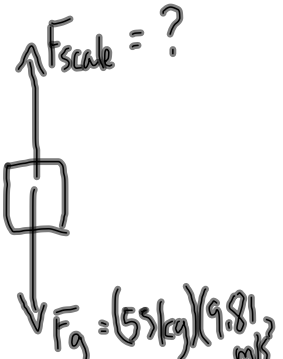
MP|184

$m = 55\,kg$

a) $F_{scale} = ?$ (not moving)

b) $F_{scale} = ?$ ($a = 0.75\,m/s^2$ [up])

a)



If you are not moving:

(or going at constant velocity)

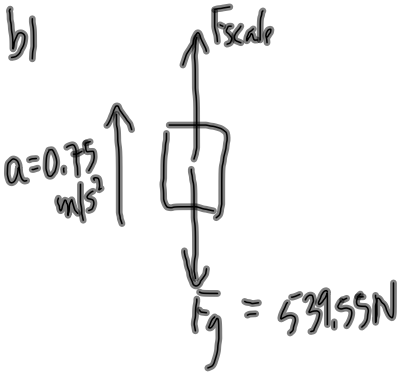
$\vec{F}_{net} = 0$

$F_{scale} - F_g = 0$

$F_{scale} = F_g$

$F_{scale} = 5.4 \times 10^2\,N$

b)



$\vec{F}_{net} = m\vec{a}$

$F_{scale} - F_g = ma$

$F_{scal} - 539.55N = (55kg)(0.75m/s^2)$

$F_{scale} - 539.55N = 41.25N$ $-539.55N$

$F_{scale} = 580.8\,N$ ON

$F_{scale} = 5.8 \times 10^2\,N$

$-9.8\,m/s^2$ (if some one cuts the cable)

← you feel heavier when there's acc (going up/speeding up going down/slowing down)

PP|182 (18+19) ← towing questions

PP|186 ← elevator problem.