Kraft

F = verdi benevnelse

↑ vektor

$kg \cdot m/s^2$

N Newton

$\sum F = m \cdot a$ ← Newtons 2. lov

m: masse

a: akselerasjon

$\sum F = 0$: $a = 0$

v er konstant

← Newtons 1. lov

Summen av kreftene

$F = F$ Kraft er lik motkraft

← Newtons 3 lov

Symboler

$F, G, R, U, N, \ldots$

tyngde kraft

friksjons kraft

Tyngdekraft $G = ma = mg$

konstant

Eks: $m = 70{,}0\ kg$

$g = 9{,}81\ m/s^2$

feltstyrke

$G = 70{,}0 \cdot 9{,}81\ [kg \cdot m/s^2]$

$= 686{,}7\ [N]$

På månen $g_m = 1{,}62\ m/s^2$

$G = 70{,}0 \cdot 1{,}62 = 113{,}4\ [N]$

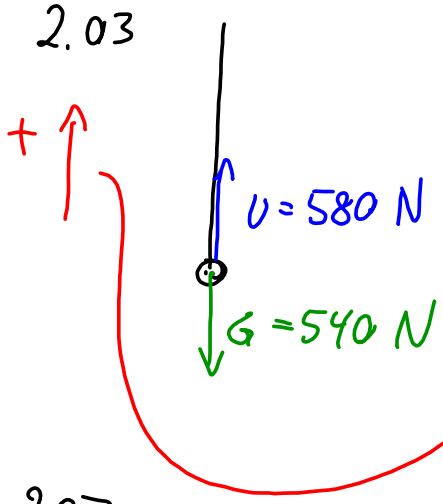
$m' = \frac{113{,}4}{9{,}81} = 11{,}5\ kg$

Fiktiv/vekt på månen

i orden

feil

2.03



$\Sigma F = U - G$

$= 580\,N - 540\,N$

$= 40\,N$

→ + ↑ virker oppover

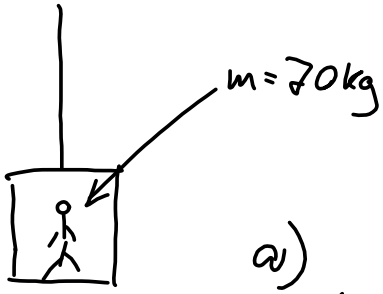
2.07

a) $m = 4{,}0\,kg \quad G = mg = 4{,}0[kg] \cdot 9{,}81\left[\frac{m}{s^2}\right] = 39{,}2[N]$

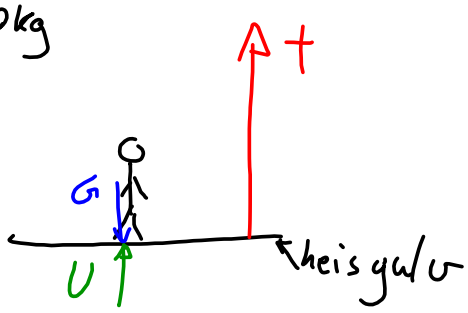
b) $G = 29\,N \quad m = \frac{G}{g} = \frac{29\,N}{9{,}81\,m/s^2} = 3{,}0\,\frac{kg \cdot m/s^2}{m/s^2} = 3{,}0\,kg$

c) $G = m \cdot g_m = 30\,kg \cdot 1{,}62\,m/s^2 = 49\,N$

2.13



a)



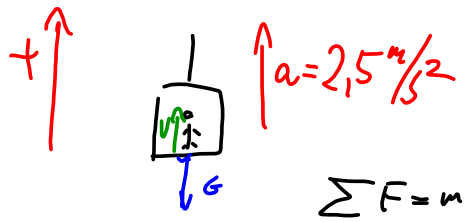
$\Sigma F = 0 = U - G$

$U = G = 70 \cdot 9{,}81 = 687\,N$

$G = 687\,N$ nedover $U = 687\,N$ oppover

2.13 b)

$G = m \cdot g = 687$ nedover

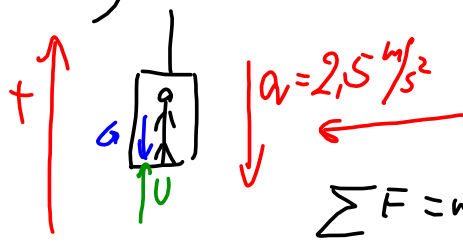


$\sum F = m \cdot a = U - G$

$U = ma + G = 70 \cdot 2{,}5 + 687 = 175 + 687 = 862\,N$

c)

$G = 687\,N$ nedover



a peker i minus retning

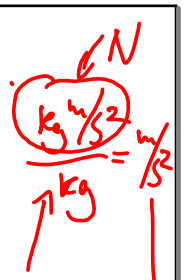
$\sum F = m \cdot a = U - G$

$U = m \cdot a + G = 687 - 70 \cdot 2{,}5 = 687 - 175 = 512\,N$

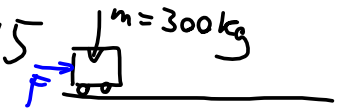
2.14

a) $a = \frac{\Delta v}{\Delta t} = \frac{v_2 - v_1}{t_2 - t_1} = \frac{1{,}0\ m/s - 0{,}0\ m/s}{4{,}0\ s - 0{,}0\ s} = 0{,}25\ m/s^2$

b) $\Sigma F = m \cdot a = 12\ kg \cdot 0{,}25\ m/s^2 = 3{,}0\ N$



2.15



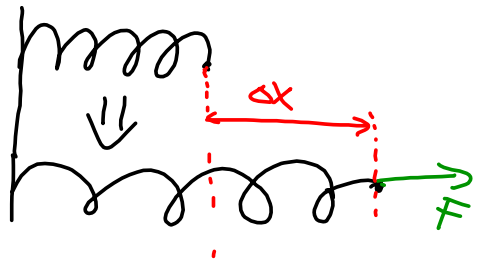
a) $\Sigma F = m \cdot a \Rightarrow a = \frac{F}{m} = \frac{600\ N}{300\ kg} = 2{,}0\ m/s^2$

b) $v = a \cdot t = 2{,}0 \cdot 8{,}0\ [m/s^2 \cdot s] = 16{,}0\ m/s$

c) $s = v_0 \cdot t + \frac{1}{2} a t^2 = \frac{1}{2} 2{,}0\ [m/s^2] \cdot 8{,}0^2\ [s^2] = 64{,}0\ [m]$

v_0

Fjærkraft



Hookes lov

$F = k \cdot x$

x: forlengelse/forkortelse [m]

k: fjærstivhet $\left[\frac{N}{m}\right]$

2.21

a) $\Delta x = 4{,}0\,cm \quad F = 10\,N$

$$k = \frac{F}{\Delta x} = \frac{10\,N}{0{,}04\,m} = 250\left[\frac{N}{m}\right]$$

b) $$\Delta x_2 = \frac{F}{k} = \frac{15\,N}{250\,\frac{N}{m}} = 0{,}06\,m = 6{,}0\,cm$$