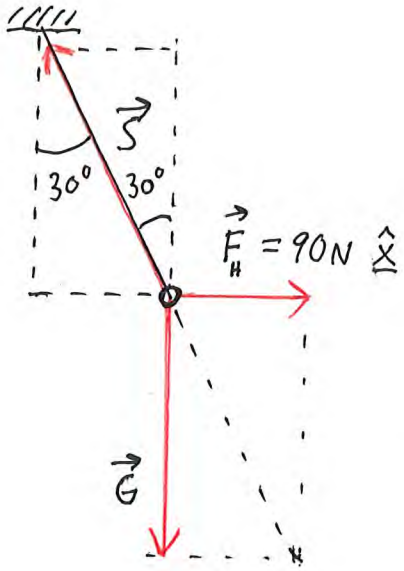
13.01

a)



b) $\sum F_x = 0$

$S_x = F_H$

$S \cdot \sin 30° = F_H$

$S = \frac{90N}{\sin 30°} = 180N = \underline{0{,}18kN}$

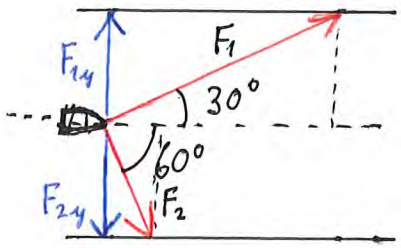
c) $\sum F_y = 0$

$S_y = G$

$S \cdot \cos 30° = G$

$G = 180N \cdot \cos 30° = 155{,}8N = \underline{0{,}16kN}$

13.02



$F_1 = 6{,}0kN$

a) $\sum F_y = 0$

$F_{1y} = F_{2y}$

$F_1 \cdot \sin 30° = F_2 \cdot \sin 60°$

$\frac{F_1 \cdot \sin 30°}{\sin 60°} = F_2$

$F_2 = \frac{6{,}0kN \cdot \sin 30°}{\sin 60°} = 3{,}464kN = \underline{3{,}5kN}$

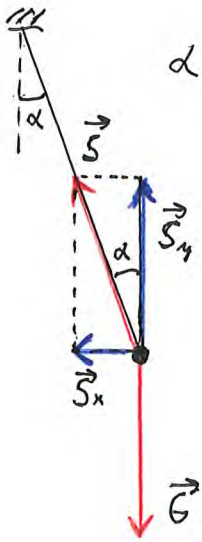
b) $\sum F_x = 0$, $v_x = konst$

$R = F_{1x} + F_{2x}$

$R = F_1 \cdot \cos 30° + F_2 \cdot \cos 60° = 6{,}0kN \cdot \cos 30° + 3{,}464kN \cdot \cos 60°$

$= \underline{6{,}9kN}$

13.04



$\alpha = 18°$

a) $\sum F_y = 0$

$S_y = G$

$S \cdot \cos\alpha = mg$

$S = \frac{mg}{\cos\alpha}$

$\sum F_x = ma$

$S_x = ma$

$S \cdot \sin\alpha = ma$

$a = \frac{S \cdot \sin\alpha}{m}$

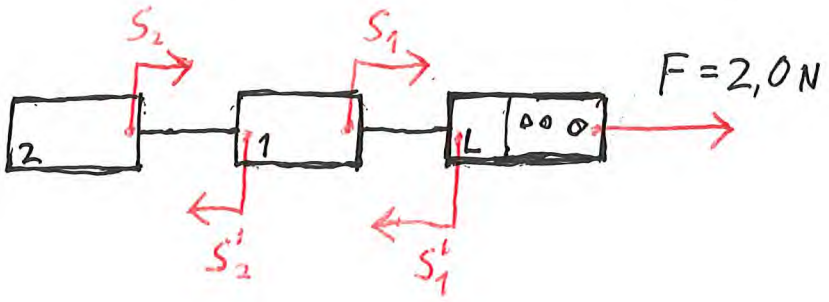
$a = \frac{mg}{\cos\alpha} \cdot \frac{\sin\alpha}{m}$

$a = g \cdot \tan\alpha = 9{,}81\frac{m}{s^2} \cdot \tan 18°$

$= \underline{3{,}2\frac{m}{s^2}}$

b) $a = 3{,}2\frac{m}{s^2}$ fordi a er uavhengig av massen.

13.05 $m_L = 0{,}20\,kg$ $m_1 = m_2 = 0{,}15\,kg$



$$\sum F = ma$$

Hele toget: er systemet

$$F = (m_L + m_1 + m_2) \cdot a$$

$$a = \frac{F}{(m_L + m_1 + m_2)}$$

$$a = \frac{2{,}0\,N}{(0{,}20 + 0{,}15 + 0{,}15)\,kg} = 4{,}0\,\frac{m}{s^2}$$

De to vognene: er systemet

$$\sum F = ma$$

$$S_1 = (m_1 + m_2) \cdot a$$

$$S_1 = (0{,}15 + 0{,}15)\,kg \cdot 4{,}0\,\frac{m}{s^2} = \underline{1{,}2\,N}$$

Bakerste vogn: er systemet

$$\sum F = m_2 a$$

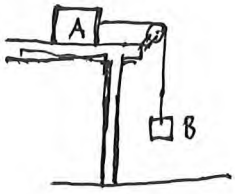
$$S_2 = m_2 \cdot a$$

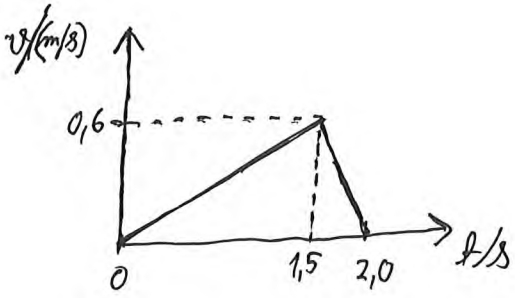
$$S_2 = 0{,}15\,kg \cdot 4{,}0\,\frac{m}{s^2} = \underline{0{,}60\,N}$$

13.06 $m_A = 2{,}6\,kg$

$t_B = 1{,}5\,s$

$a = \frac{\Delta v}{\Delta t}$

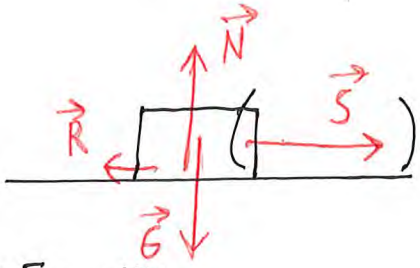




a) $a_1 = \frac{(0{,}6-0)\frac{m}{s}}{(1{,}5-0)\,s} = \underline{0{,}40\,\frac{m}{s^2}}$

$a_2 = \frac{(0-0{,}6)\frac{m}{s}}{(2{,}0-1{,}5)\,s} = \underline{-1{,}2\,\frac{m}{s^2}}$

b)



$\mu = \frac{R}{N} = \frac{R}{G}$

$\Delta E_k = W_f$

$W_f = R \cdot s$

$\frac{1}{2} m v^2 = R \cdot s$

$R = \frac{m v^2}{2s}$

$\mu = \frac{R}{G} = \frac{\frac{m v^2}{2s}}{mg} = \frac{v^2}{2s \cdot g} = \frac{(0{,}60\,\frac{m}{s})^2}{2 \cdot 0{,}15\,m \cdot 9{,}81\,\frac{m}{s^2}} = 0{,}1223 = \underline{0{,}12}$

$2as = v^2 - v_0^2$

$s = \frac{-v_0^2}{2a}$

$s = \frac{-(0{,}6\,\frac{m}{s})^2}{2 \cdot (-1{,}2\,\frac{m}{s^2})} = 0{,}15\,m$

c) $\sum F = ma$

$S - R = ma_1$

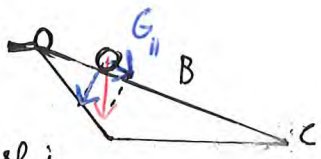
$S = ma_1 + R$

$S = ma_1 + \mu G = ma_1 + \mu mg = m \cdot (a_1 + \mu g)$

$= 2{,}6\,kg \cdot (0{,}40\,\frac{m}{s^2} + 0{,}1223 \cdot 9{,}81\,\frac{m}{s^2})$

$= 4{,}159\,N = \underline{4{,}2\,N}$

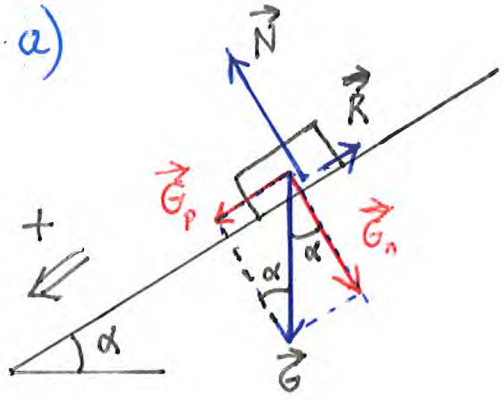
13.09



$G_{||}$ størst i bratteste bane.

Kule A vinner. De to banene er omtrent like lange, men bane A er klart brattere i første halvdel. Dette gir større akselerasjon i første halvdel av banen, noe som gjør at kula der har maks. fart lenge før kula i B-banen. Siden vil maksfarten holde seg til C mens kula i B ikke når samme maksfart før den er framme. Begge kuler har samme sluttfart grunnet lik E_{pot} ved start i forhold til punkt C.

13.07 a)



$m = 2{,}0\,kg$

$\alpha = 32°$

$\vec{R} = 0$

p : parallellretning i forhold til skråplanet

n : normalretningen i forhold til skråplanet

$\vec{R} = 0$ på tegninga

Dette gir $\sum F_p = ma_p$

$G_p = ma_p$

$mg \cdot \sin\alpha = ma_p$

$a_p = g \cdot \sin\alpha$

$a_p = 9{,}81\frac{m}{s^2} \cdot \sin 32° = \underline{5{,}2\frac{m}{s^2}}$

b) $\mu = 0{,}20$

$\sin\alpha = \frac{G_p}{G}$ $\quad \cos\alpha = \frac{G_n}{G}$

$G_p = G \cdot \sin\alpha$ $\quad G_n = G \cdot \cos\alpha$

$\boxed{G_p = mg \cdot \sin\alpha}$ $\quad \boxed{G_n = mg \cdot \cos\alpha}$

$\boxed{R = \mu N}$ fordi $\mu = \frac{R}{N}$

og $\sum F_n = 0$

$N - G_n = 0$

$\boxed{N = G_n = mg \cdot \cos\alpha}$

$\sum F_p = ma_p$

$G_p - R = ma_p$

$mg \cdot \sin\alpha - \mu \cdot mg \cdot \cos\alpha = ma_p$

$g \cdot \sin\alpha - \mu g \cdot \cos\alpha = a_p$

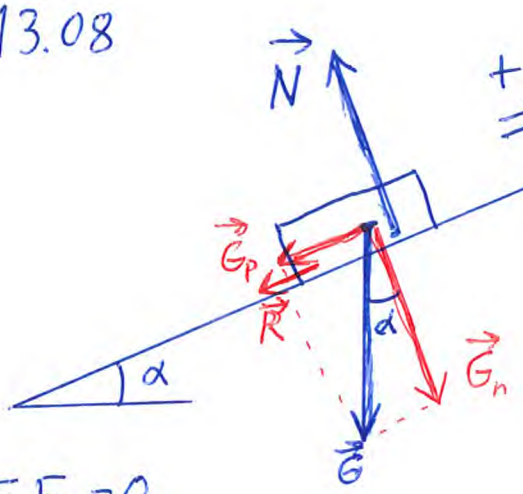
$a_p = g \cdot (\sin\alpha - \mu \cdot \cos\alpha)$

$a_p = 9{,}81\frac{m}{s^2} \cdot (\sin 32° - 0{,}20 \cdot \cos 32°)$

$\underline{a_p = 3{,}5\frac{m}{s^2}}$

c) m er en faktor i alle ledd i Newtons 2. lov og kan dermed strykes ved at vi deler alle ledd på massen.

13.08



$v = 0$ $\quad V_0 = 3{,}4\ \frac{m}{s}$

$\mu = 0{,}20$ $\quad \alpha = 32°$

$\sum F_n = 0$

$N - G_n = 0$

$N = G \cdot \cos\alpha$

$N = mg \cdot \cos\alpha$

a) $\sum F_p = ma$

$-G_p - R = ma$

$-G \cdot \sin\alpha - \mu N = ma$

$-mg \cdot \sin\alpha - \mu mg\cos\alpha = ma$

$-g(\sin\alpha + \mu\cos\alpha) = a$

$a = -9{,}81\ \frac{m}{s^2} \cdot (\sin 32° + 0{,}20 \cdot \cos 32°)$

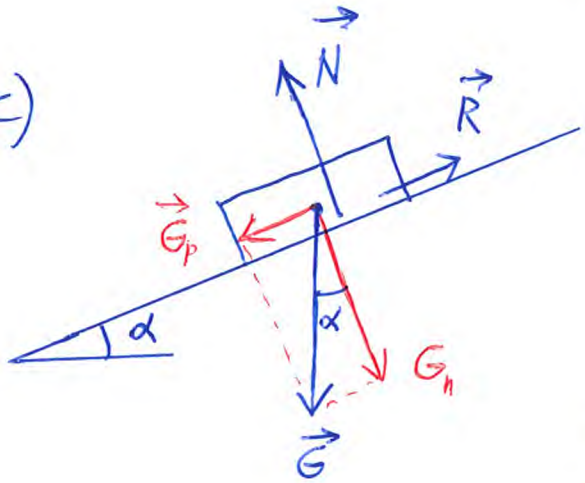
$\underline{a = -6{,}9\ \frac{m}{s^2}}$ $\quad (-6{,}862\ \frac{m}{s^2})$

b) $2as = v^2 - v_0^2$ og $v = 0$

$2as = -v_0^2$

$s = \frac{-v_0^2}{2a} = \frac{-(3{,}4\ \frac{m}{s})^2}{2 \cdot (-6{,}862\ \frac{m}{s^2})} = \underline{0{,}84\,m}$

c)



$m = 2{,}0\,kg$

$G_p = mg\sin\alpha$

$= 2{,}0\,kg \cdot 9{,}81\ \frac{N}{kg} \cdot \sin 32°$

$= 10{,}39\,N$

$R_{gli} = \mu N = \mu G_n = \mu mg\cos\alpha$

$= 0{,}20 \cdot 2{,}0\,kg \cdot 9{,}81\ \frac{N}{kg} \cdot \cos 32°$

$= 3{,}32\,N$

$R_{gli} < G_p$

⇓

glidefriksjon. Klossen glir ned

13,10 a)

$S = 78{,}4 \cdot 10^3\,N$

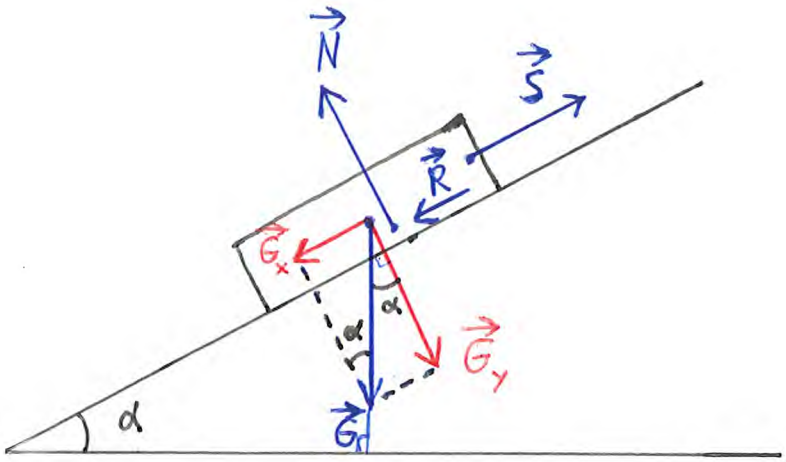
$\alpha = 28°$

$m = 9{,}2 \cdot 10^3\,kg$

$G = mg = 9{,}2 \cdot 10^3\,kg \cdot 9{,}81\,\frac{N}{kg}$

$= \underline{9{,}0 \cdot 10^4\,N}$

$(9{,}025 \cdot 10^4\,N)$



$\Sigma F_y = 0$

$N - G_y = 0$

+ ⇑

$N = G_y = G \cdot \cos\alpha$

$N = 9{,}025 \cdot 10^4\,N \cdot \cos 28° = \underline{8{,}0 \cdot 10^4\,N}$ $(7{,}968 \cdot 10^4\,N)$

$\Sigma F_x = 0$

+ ⇗

$S - R - G_x = 0$

$R = S - G_x = S - G \cdot \sin\alpha$

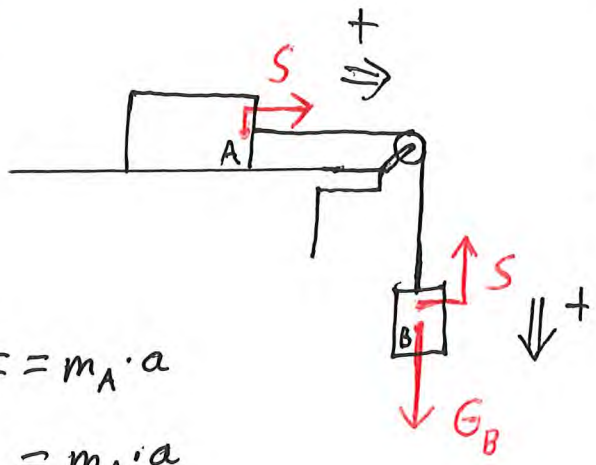
$R = 78{,}4 \cdot 10^3\,N - 9{,}025 \cdot 10^4\,N \cdot \sin 28°$

$\underline{R = 3{,}6 \cdot 10^4\,N}$ $(3{,}603 \cdot 10^4\,N)$

b) $\mu = \frac{R}{N}$

$\mu = \frac{3{,}603 \cdot 10^4\,N}{7{,}968 \cdot 10^4\,N} = \underline{0{,}45}$

13.12



$m_A = 7{,}8\,kg$

$a = 2{,}0\,\frac{m}{s^2}$

$m_B = ?$

Delsystem

A: $\sum F = m_A \cdot a$

$S = m_A \cdot a$

Delsystem

B: $\sum F = m_B \cdot a$

$G_B - S = m_B \cdot a$

$m_B \cdot g - S = m_B \cdot a$

$m_B \cdot g - m_A \cdot a = m_B \cdot a$

$m_B \cdot (g - a) = m_A \cdot a$

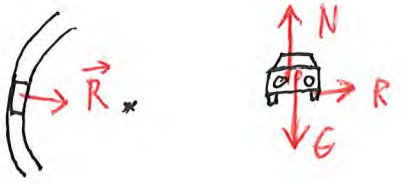
$$m_B = \frac{m_A \cdot a}{(g-a)}$$

$$m_B = \frac{7{,}8\,kg \cdot 2{,}0\,\frac{m}{s^2}}{(9{,}81 - 2{,}0\,\frac{m}{s^2})} = \underline{2{,}0\,kg}$$

13.14 $v = 20\,\frac{km}{h} = 20 \cdot \frac{1000\,m}{3600\,s} = 5{,}555\,\frac{m}{s}$

$r = 6{,}0\,m \qquad m = 1000\,kg$

a)



$\Sigma F = m\frac{v^2}{r}$

$R = m\frac{v^2}{r} = 1000\,kg \cdot \frac{(5{,}555\,\frac{m}{s})^2}{6{,}0\,m}$

$= 5143\,N = \underline{5{,}1\,kN}$

mot sentrum i sirkelen.

b) $\mu_1 = 0{,}80 \qquad \mu_2 = 0{,}20$

$R = \mu N = \mu G = \mu m g$

$\Sigma F = m\frac{v^2}{r}$

$\mu m g = m\frac{v^2}{r}$

$\mu g r = v^2$

$v = \sqrt{\mu g r}$

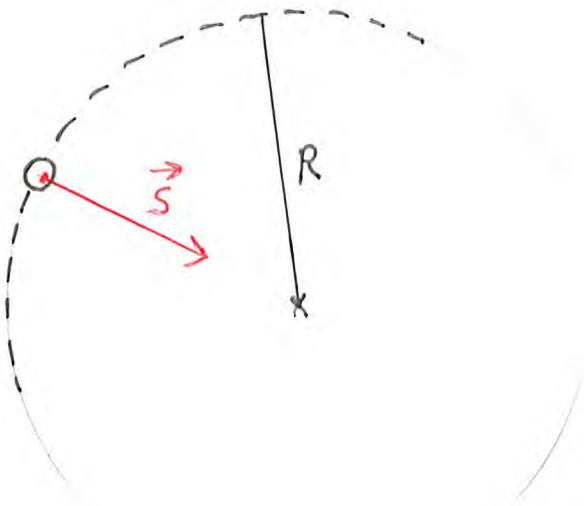
$v_1 = \sqrt{\mu_1 g r} = \sqrt{0{,}80 \cdot 9{,}81 \cdot 6{,}0}\,\frac{m}{s} = \underline{6{,}862\,\frac{m}{s}}$

$v_2 = \sqrt{\mu_2 g r} = \sqrt{0{,}20 \cdot 9{,}81 \cdot 6{,}0}\,\frac{m}{s} = \underline{3{,}431\,\frac{m}{s}}$

$v_1 = 6{,}862 \cdot 3{,}6\,\frac{km}{h} = \underline{25\,\frac{km}{h}}$

$v_2 = 3{,}431 \cdot 3{,}6\,\frac{km}{h} = \underline{12\,\frac{km}{h}}$

13.15 $m = 1{,}5\,kg \qquad R = 1{,}2\,m \qquad S = 40\,N$



$\Sigma F = m a$

$S = m\frac{v^2}{R}$

$\frac{S \cdot R}{m} = v^2$

$v = \sqrt{\frac{S \cdot R}{m}}$

$v = \sqrt{\frac{40\,N \cdot 1{,}2\,m}{1{,}5\,kg}} = 5{,}656\,\frac{m}{s}$

$= \underline{5{,}7\,\frac{m}{s}}$

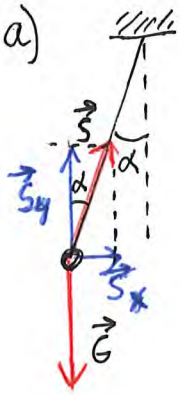
$S = v \cdot t$

Tiden for ett omløp: $t = \frac{S}{v} = \frac{2\pi R}{v} = \frac{2\pi \cdot 1{,}2\,m}{5{,}656\,\frac{m}{s}} = 1{,}333\,s$

Antall omløp på ett minutt: $n = \frac{60\,s}{1{,}333\,s} = \underline{45}$

13.17 $v = 80\,\frac{km}{h} = 22{,}22\,\frac{m}{s}$ $\quad m = 0{,}20\,kg$ $\quad \alpha = 22°$

a) Snordrag S og tyngde G



b) $\sum F_y = 0$

$S_y = G$

$S \cdot \cos\alpha = mg$

$$S = \frac{mg}{\cos\alpha} = \frac{0{,}20\,kg \cdot 9{,}81\,\frac{N}{kg}}{\cos 22°} = 2{,}116\,N$$

$$= \underline{2{,}1\,N}$$

c) $\sum F_x = m\frac{v^2}{r}$

$S_x = m\frac{v^2}{r}$

$S \cdot \sin\alpha = m\frac{v^2}{r}$

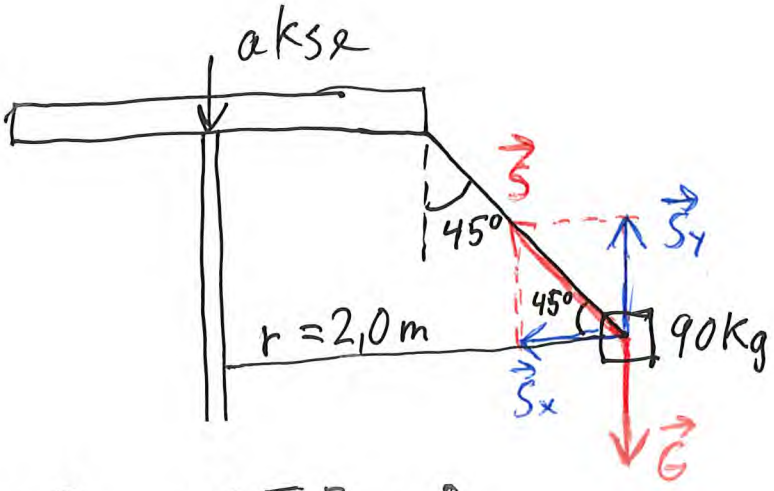
$r \cdot S \cdot \sin\alpha = mv^2$

$$r = \frac{mv^2}{S \cdot \sin\alpha} = \frac{0{,}20\,kg \cdot (22{,}22\,\frac{m}{s})^2}{2{,}116\,N \cdot \sin 22°} = 124{,}5\,m$$

$$= \underline{0{,}12\,km}$$

13.18

a)



b) $S = ?$ $\quad y: \sum F = 0$

$S_y - G = 0$

$S_y = G$

$S \cdot \sin 45° = mg$

$$S = \frac{mg}{\sin 45°} = \frac{90\,kg \cdot 9{,}81\,\frac{N}{kg}}{\sin 45°} = 1248\,N$$

$$= \underline{1{,}2\,kN}$$

c) $x: \sum F = ma$

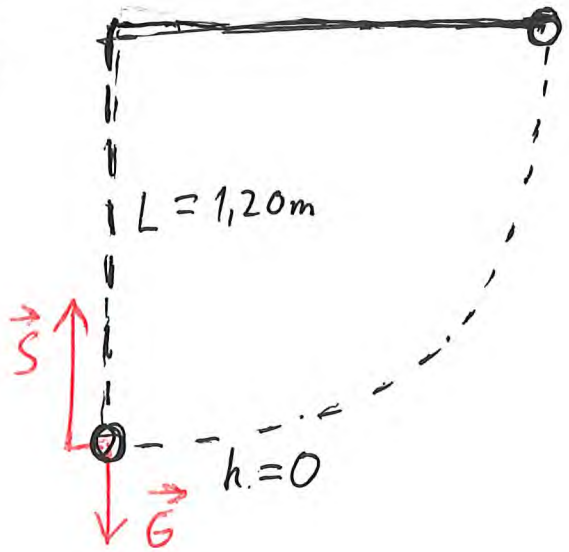
$S_x = m\frac{v^2}{r}$ $\qquad S_x = S \cdot \cos 45° = 1248\,N \cdot \cos 45°$

$= 882{,}4\,N$

$= \underline{0{,}88\,kN}$

13.19

a)



$m = 0,50\,kg$
$V_0 = 0$
$h = L = r$

b) $E_k + E_p = E_{k0} + E_{p0}$

$\frac{1}{2}mv^2 = mgh$

$v^2 = 2gh$

$v = \sqrt{2gh}$

$v = \sqrt{2 \cdot 9,81 \cdot 1,20}\ \frac{m}{s} = 4,852\ \frac{m}{s}$

$v = 4,85\ \frac{m}{s}$

$a = \frac{v^2}{r} = \frac{2gh}{h} = 2g$

$= 19,6\ \frac{m}{s^2}$ rett opp

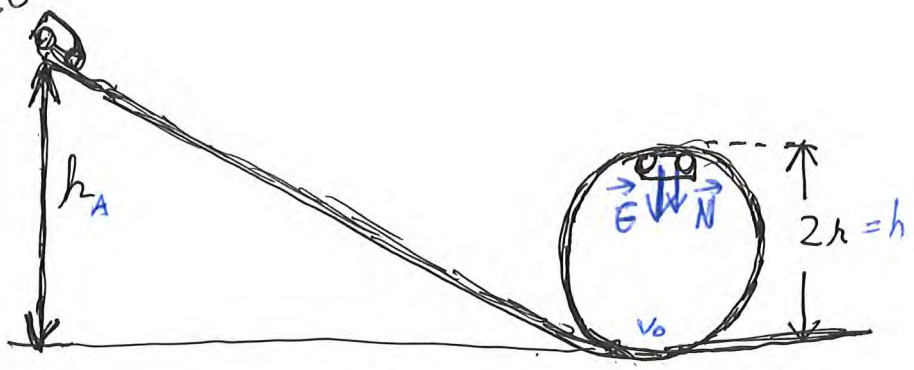
c) $\sum F = ma$

+↑ $S - G = m\frac{v^2}{r}$

$S = m\left(g + \frac{v^2}{r}\right)$

$S = 0,50\,kg(9,81 + 19,6)\ \frac{m}{s^2} = 15\,N$ opp

13.20



$m = 0{,}050\,kg$
$d = 0{,}24\,m$
$v_0 = 3{,}1\,\frac{m}{s}$ ved bakkenivå

a) $E_p + E_k = E_{p0} + E_{k0}$

$mgh + \frac{1}{2}mv^2 = \frac{1}{2}mv_0^2$

$gh + \frac{1}{2}v^2 = \frac{1}{2}v_0^2$

$v^2 = v_0^2 - 2gh$

$\sum F_y = ma_y$ toppen

$G + N = m\frac{v^2}{r}$

$mg + N = m\frac{v^2}{r}$

$N = m\left(\frac{v^2}{r} - g\right)$

$N = m\left(\frac{v_0^2 - 2g\cdot 2r}{r} - g\right)$

$N = m\left(\frac{v_0^2}{r} - 4g - g\right) = m\left(\frac{v_0^2}{r} - 5g\right)$

$N = \left(\frac{(3{,}1\frac{m}{s})^2}{0{,}12\,m} - 5\cdot 9{,}81\frac{N}{kg}\right)\cdot 0{,}050\,kg$

$= 1{,}551\,N = \underline{1{,}6\,N}$ nedover

b) $N = 0 \quad v_0 = ?$

$\frac{v_0^2}{r} - 5g = 0$

$\frac{v_0^2}{r} = 5g$

$v_0^2 = 5gr$

$v_0 = \sqrt{5gr} = \sqrt{5\cdot 9{,}81\frac{m}{s^2}\cdot 0{,}12\,m} = 2{,}426\frac{m}{s} = \underline{2{,}4\frac{m}{s}}$

c) $E_p = E_{k0}$

$mgh = \frac{1}{2}mv_0^2$

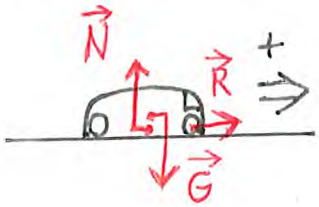
$gh = \frac{1}{2}v_0^2$

$gh = \frac{1}{2}\cdot 5gr$

$h = \frac{5}{2}r = \frac{5}{2}\cdot 0{,}12\,m = \underline{0{,}30\,m}$

13.21 Bil $G = 13 \cdot 10^3 N$ $v_0 = 0$ $v = 16 \frac{m}{s}$ $t = 12 s$

a)



Under akselerasjon virker friksjonskrafta i samme retning som akselerasjonen. Hvis R var null ville hjulene spinne. Motkrafta til R virker på veien og fører til at grus og småstein skvetter bakover når du trykker på gassen på en grusvei.

$\sum F_y = 0$

$N - G = 0$

$N = G = \underline{13 \cdot 10^3 N}$

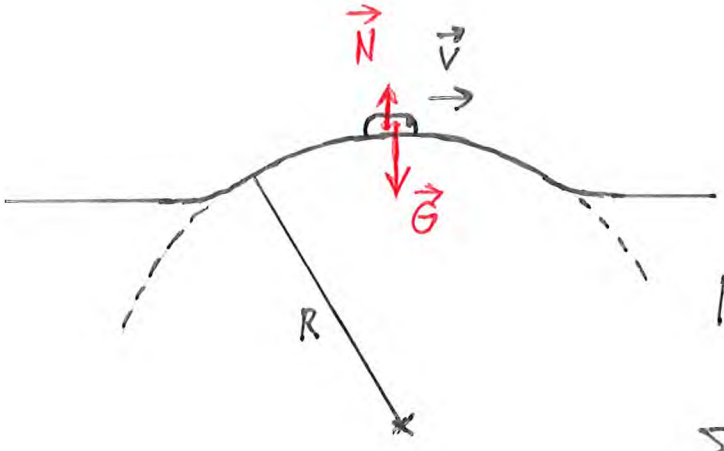
b) $\sum F = ma$

$\sum F = R = ma = \frac{G}{g} \cdot \left(\frac{v - v_0}{t}\right) = \frac{13 \cdot 10^3 N}{9{,}81 \frac{m}{s^2}} \cdot \left(\frac{16 - 0}{12}\right) \frac{m}{s^2} = 1766 N$

$= \underline{1{,}8 kN}$

$\left(\frac{G}{g} = 1325 kg\right)$

c) $v = 16 \frac{m}{s}$ $R = 100 m$



$\sum F = ma$

$G - N = m \frac{v^2}{R}$

$G - m \frac{v^2}{R} = N$

$N = 13 \cdot 10^3 N - 1325 \cdot \frac{16^2}{100} N$

$= 9608 N = \underline{9{,}6 kN}$

$N = 0$ hvis bilen svever.

$\sum F = ma$

$G = m \frac{v^2}{R}$

$mg = m \frac{v^2}{R}$

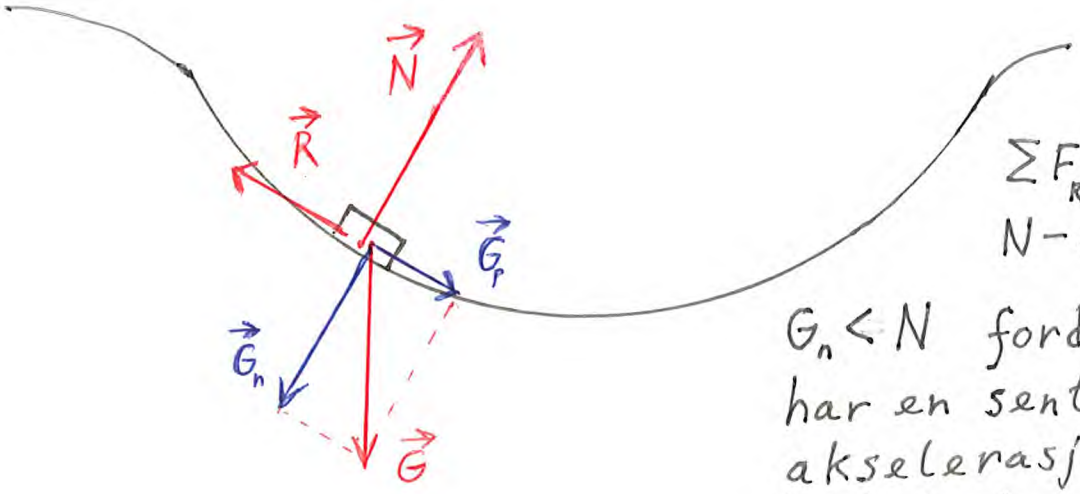
$g = \frac{v^2}{R}$

$gR = v^2$

$v = \sqrt{gR} = \sqrt{9{,}81 \cdot 100} \frac{m}{s}$

$\underline{v = 31 \frac{m}{s}}$

13,22



$$\sum F_R = m\frac{v^2}{R}$$

$$N - G_n = m\frac{v^2}{R}$$

$G_n < N$ fordi kjelken har en sentripetal-akselerasjon mot sentrum i sirkelen.

$R > G_p$ fordi kjelken bremser normalt på radiell retning.

$R < N$ fordi μ normalt er mindre enn 1,0.

13.23 $m = 0{,}300\,kg$ $k = 3{,}0\,\frac{N}{m}$

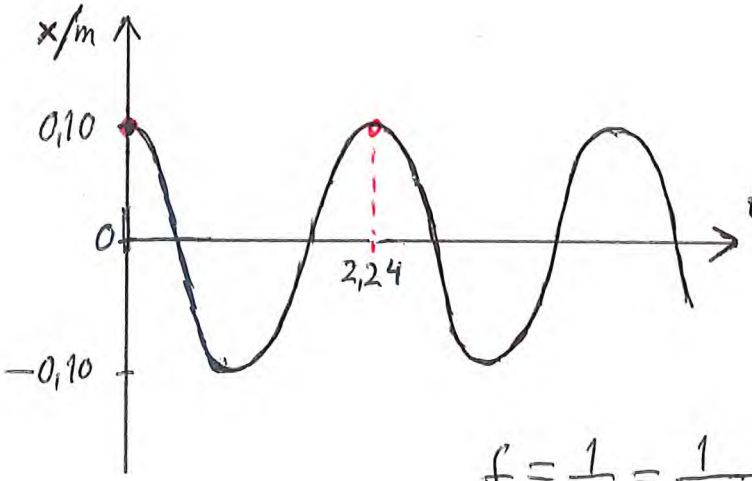
$$f = \frac{1}{2\pi}\sqrt{\frac{k}{m}} = \frac{1}{2\pi}\sqrt{\frac{3{,}0\,\frac{N}{m}}{0{,}300\,kg}} = 0{,}5032\,s^{-1} = \underline{0{,}50\,Hz}$$

$$T = \frac{1}{f} = \frac{1}{0{,}5032\,s^{-1}} = 1{,}987\,s = \underline{2{,}0\,s}$$

13.24 $x(t) = 0{,}070\,m \cdot \cos(2\pi \cdot 0{,}60\,s^{-1} \cdot t)$

$A = \underline{0{,}070\,m}$ $\quad f = 0{,}60\,s^{-1} \Rightarrow T = \frac{1}{f} = \frac{1}{0{,}60\,s^{-1}} = \underline{1{,}7\,s}$

13.25



$A = \underline{0{,}10\,m}$

$T = (2{,}24 - 0{,}00)\,s = 2{,}24\,s \approx \underline{2{,}2\,s}$

$$f = \frac{1}{T} = \frac{1}{2{,}24\,s} = \underline{0{,}45\,Hz}$$

13.26 $m = 0{,}150\,kg$ $k = 2{,}0\,\frac{N}{m}$ $A = 0{,}060\,m$

a) $$f = \frac{1}{2\pi}\sqrt{\frac{k}{m}} = \frac{1}{2\pi}\sqrt{\frac{2{,}0\,\frac{N}{m}}{0{,}150\,kg}} = 0{,}5811\,s^{-1} = \underline{0{,}58\,Hz}$$

$$T = \frac{1}{f} = \frac{1}{0{,}5811\,s^{-1}} = \underline{1{,}7\,s}$$

b) $x(t) = A\cos(2\pi f t) = 0{,}060\,m \cdot \cos(2\pi \cdot 0{,}5811\,s^{-1} \cdot t)$

$= \underline{6{,}0\,cm \cdot \cos(3{,}7\,s^{-1} \cdot t)}$

$v(t) = -2\pi f A \cdot \sin(2\pi f t) = -2\pi \cdot 0{,}5811\,s^{-1} \cdot 0{,}060\,m \cdot \sin(2\pi \cdot 0{,}5811\,s^{-1} \cdot t)$

$= -0{,}22\,\frac{m}{s} \cdot \sin(3{,}7\,s^{-1} \cdot t)$

$a(t) = -4\pi^2 f^2 A \cdot \cos(2\pi f t) = -0{,}80\,\frac{m}{s^2} \cdot \cos(3{,}7\,s^{-1} \cdot t)$

c) $x(0) = \underline{6{,}0\,cm}$ $\quad x(1{,}2\,s) = \underline{-1{,}6\,cm}$

$v(0) = \underline{0}$ $\quad v(1{,}2\,s) = \underline{0{,}21\,\frac{m}{s}}$

$a(0) = \underline{-0{,}80\,\frac{m}{s^2}}$ $\quad a(1{,}2\,s) = \underline{0{,}22\,\frac{m}{s^2}}$

13,26 d) $x = 0{,}060\,m \cdot \cos(3{,}7\,s^{-1} \cdot t)$

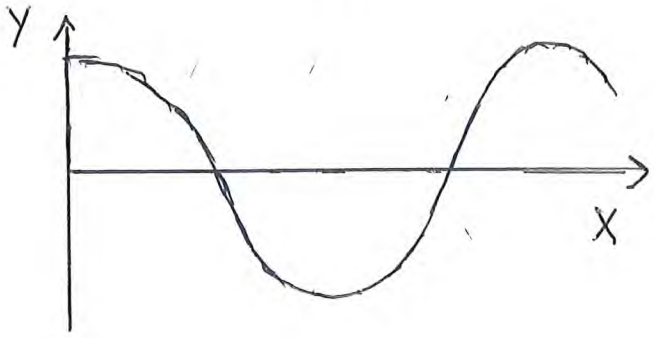
$3{,}7\,s^{-1} \cdot t = 2\pi$

$t = \frac{2\pi}{3{,}7\,s^{-1}} = 1{,}7\,s$

(ca 2)

Casio $Y1 = 0{,}06 \times \cos(3.7 \times X)$

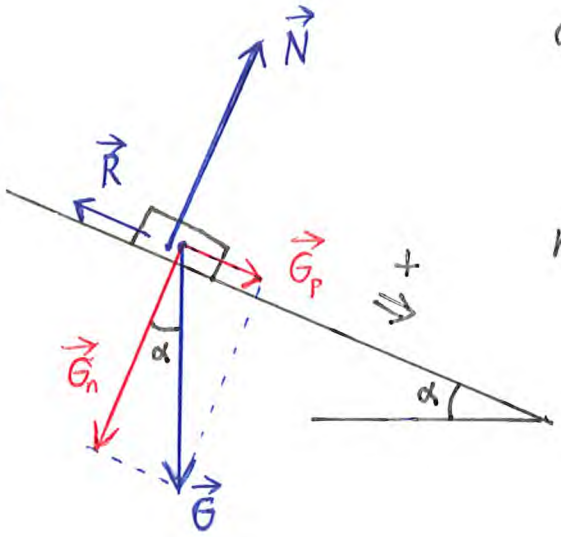
V-Window X_{min} : 0
max : 2
scale : 1
Y_{min} : −0.06
max : 0,06
scale : 1



e) $T = (1{,}698 - 0{,}0)\,s = \underline{1{,}7\,s}$ Trace (Shift) (F1)

$t = 1{,}206\,s$ gir $x = -0{,}01478\,m \approx -0{,}015\,m = \underline{-1{,}5\,cm}$

13.27



$\alpha = 4{,}0°$ $\quad v = 25\,\frac{km}{h} = 25 \cdot \frac{1000m}{3600s}$

$= 6{,}944\,\frac{m}{s}$

$m = 70kg$

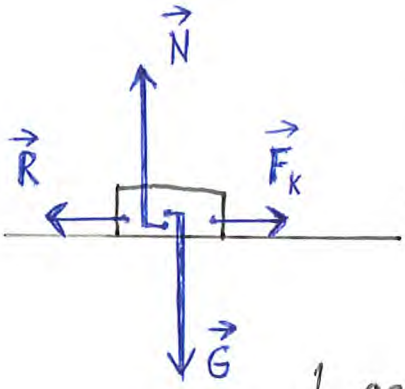
$v = konst. \Rightarrow \sum F_p = 0$

$G_p - R = 0$

$G_p = R$

$G \cdot \sin\alpha = R$

$R = mg \cdot \sin\alpha$



1. $P = \frac{W}{t} = \frac{F_K \cdot s}{t} = F_K \cdot v$

2. $\sum F_p = 0$

$F_K = mg \cdot \sin\alpha$

1. og 2. gir at $P = mg(\sin\alpha) \cdot v$

$P = 70kg \cdot 9{,}81\,\frac{N}{kg}(\sin 4{,}0°) \cdot 6{,}944\,\frac{m}{s}$

$= 332{,}6\,N\frac{m}{s} = \underline{0{,}33\,kW}$

$\left(N\frac{m}{s} = \frac{N \cdot m}{s} = \frac{J}{s} = W\right)$