Ekstra regneverksted før midtveiseksamen:

Mandag 14: 12.15-14

Onsdag 16: 14.15-16

Rom FV394.

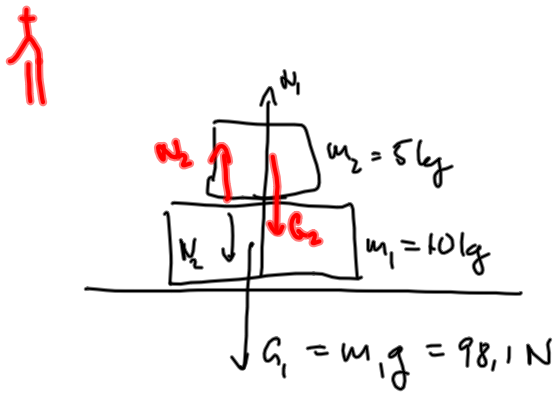
Mekanikk

Krefter: Newtons lover

1: $\sum \vec{F} = 0 \quad \Rightarrow \quad \vec{v}$ konstant

2: $\sum \vec{F} = m\vec{a}$

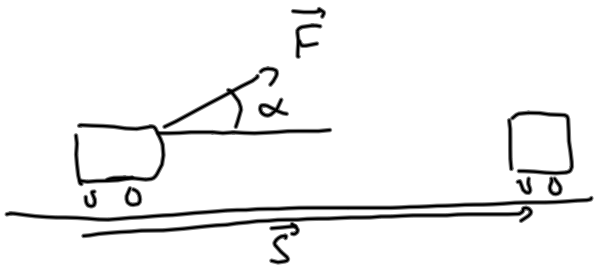
3: Kraft = motkraft



$\sum F = N_2 - G_2 = 0 \qquad N_2 = G_2 = m_2 g = 49\,N$

$\sum F = N_1 - N_2 - G_1 = 0$

$N_1 = N_2 + G_1 = m_2 g + m_1 g = (m_1 + m_2) g = 147\,N$

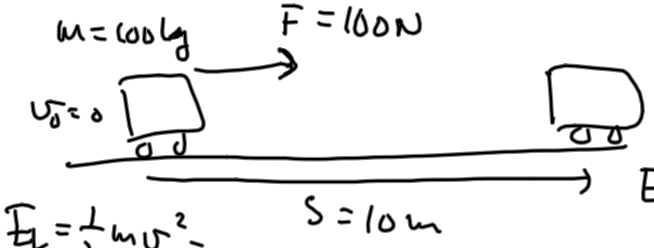


$$W = \vec{F} \cdot \vec{s} = F s \cos\alpha$$

1,2345

1,234
1,235

$$W = F \cdot s = 100\,N \cdot 10\,m = 1000\,J = 1{,}0 \cdot 10^3\,J = 1{,}0\,kJ$$



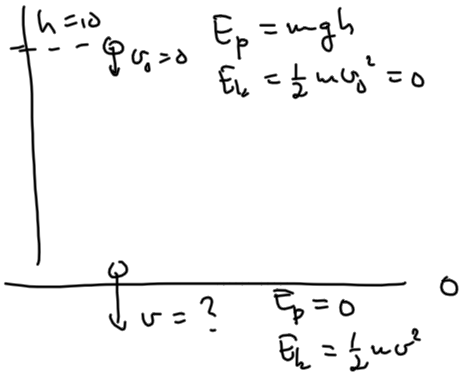
$E_k = W$

$E_k = \frac{1}{2} m v_0^2 = 0$

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

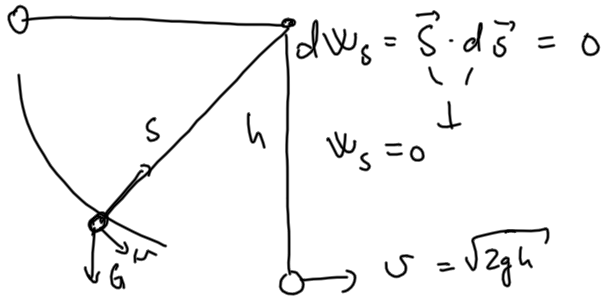
$$v = \sqrt{\frac{2Fs}{m}} = 4{,}47\,m/s \approx 4{,}5\,m/s$$

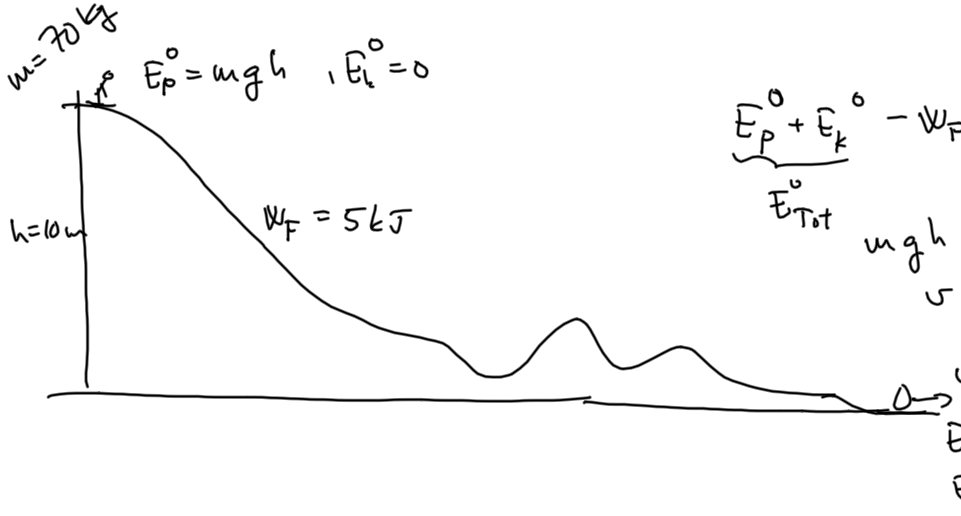
Bevaring av mekanisk energi



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

$$v = \sqrt{2gh} = 14\ m/s$$





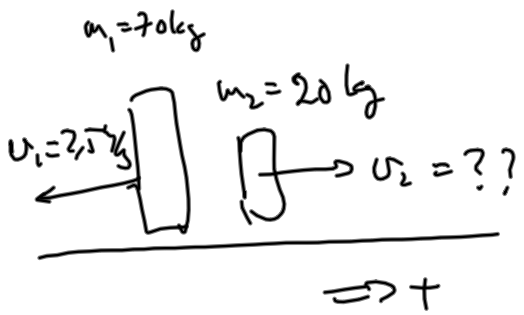
$$\underbrace{E_p^0 + E_k^0}_{E_{Tot}^0} - W_F = E_p + E_k$$

$$mgh - W_F = \tfrac{1}{2}mv^2$$

$$v = \sqrt{2gh - \frac{2W_F}{m}} = 7{,}3\ m/s$$

$$\simeq 7\ m/s$$

Bevegelsesmengde



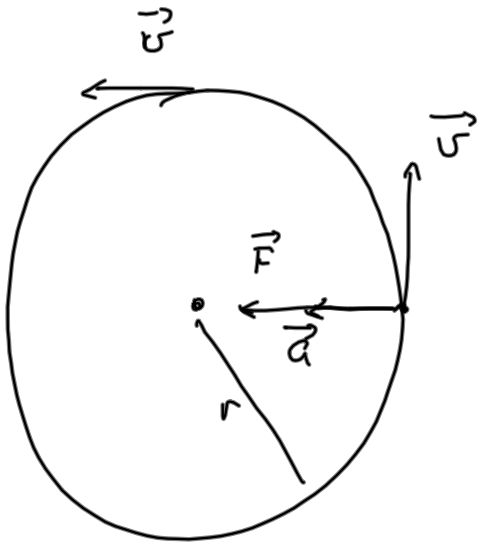
$p = m v$

Før : $p = 0$

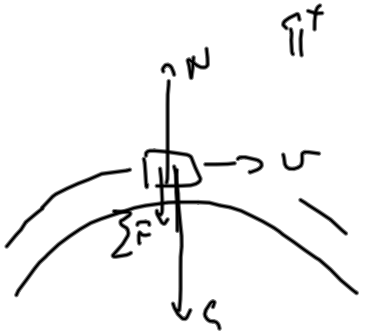
Etter: $-m_1 v_1 + m_2 v_2 = 0$

$$v_2 = \frac{m_1 v_1}{m_2} = 8{,}8\,m/s$$

Sirkelbevegelse

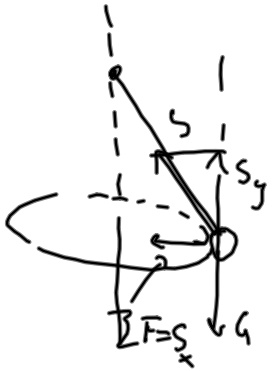


$$a = \frac{v^2}{r}$$

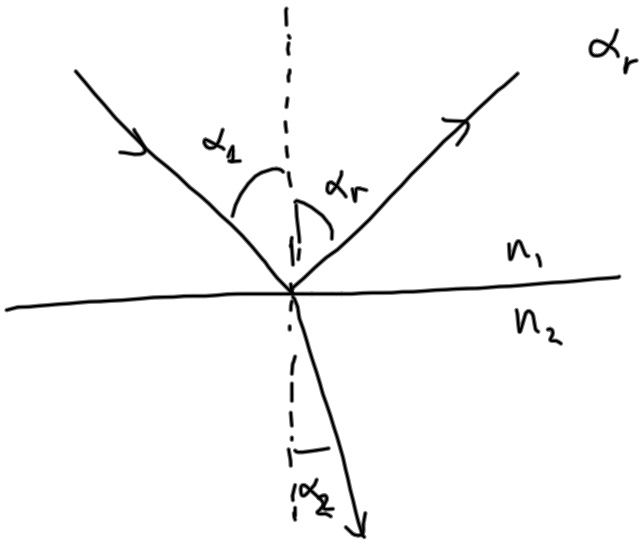


$$\sum F = N - G < 0$$

$$N < G$$



Lys: Brytning og refleksjon

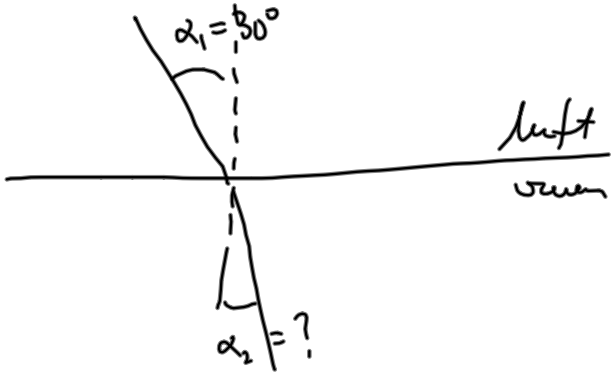


$\alpha_r = \alpha_1$

$n_1 \sin\alpha_1 = n_2 \sin\alpha_2$

$n_1 = \frac{c}{c_1}$: vakuum $= 3 \cdot 10^8$ m/s

$n_2 = \frac{c}{c_2}$



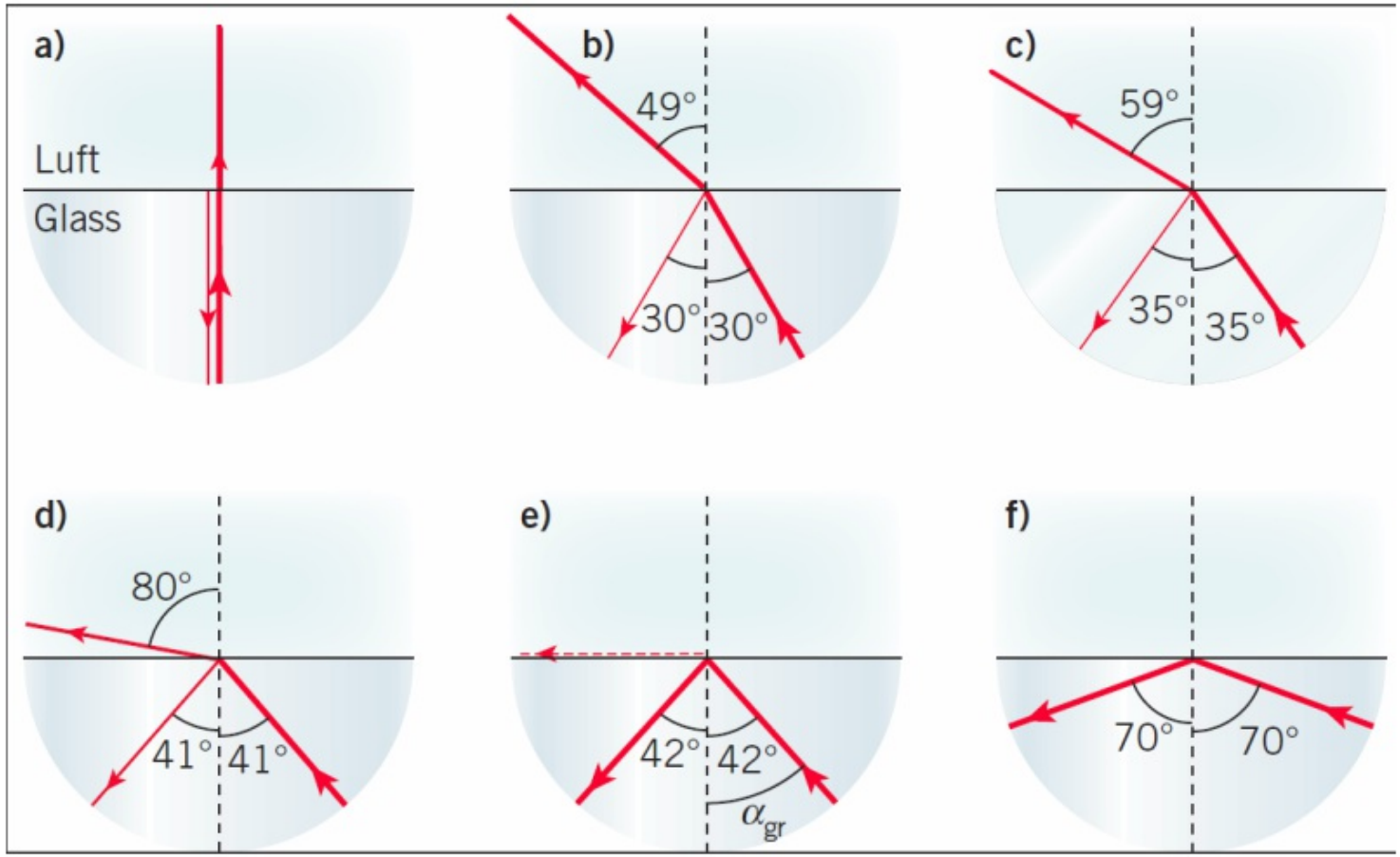
$n_1 = 1$

$n_2 = 1{,}33$

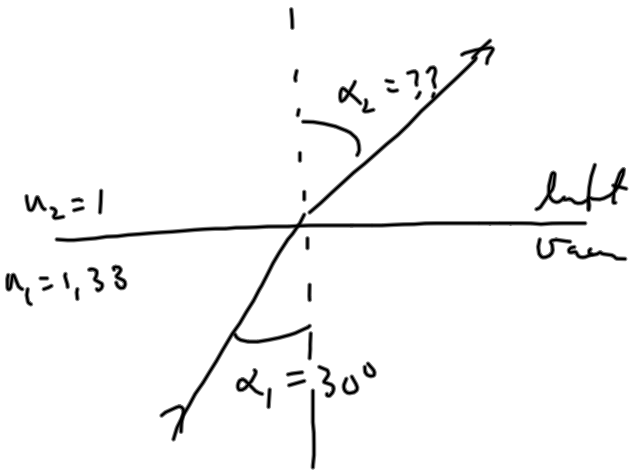
$\sin\alpha_2 = \frac{n_1 \sin\alpha_1}{n_2} = \frac{1 \cdot \sin 30°}{1{,}33} = 0{,}375$

$\alpha_2 = 22°$

Totalrefleksjon



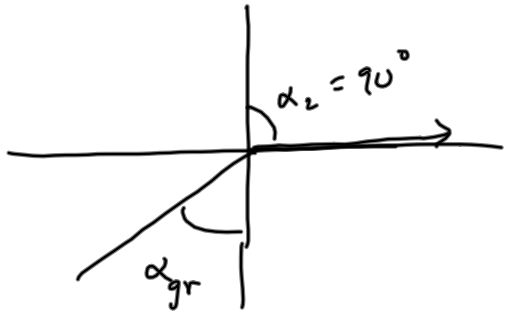
Lys går fra vann til luft. Innfallsvinkelen er 30° , hva blir brytningsvinkelen? Hva blir grensevinkelen for totalrefleksjon?



$$n_1 \sin\alpha_1 = n_2 \sin\alpha_2$$

$$\sin\alpha_2 = \frac{n_1 \sin\alpha_1}{n_2} = \frac{1,33 \cdot \sin 30°}{1} = 0,665$$

$$\alpha_2 = 42°$$

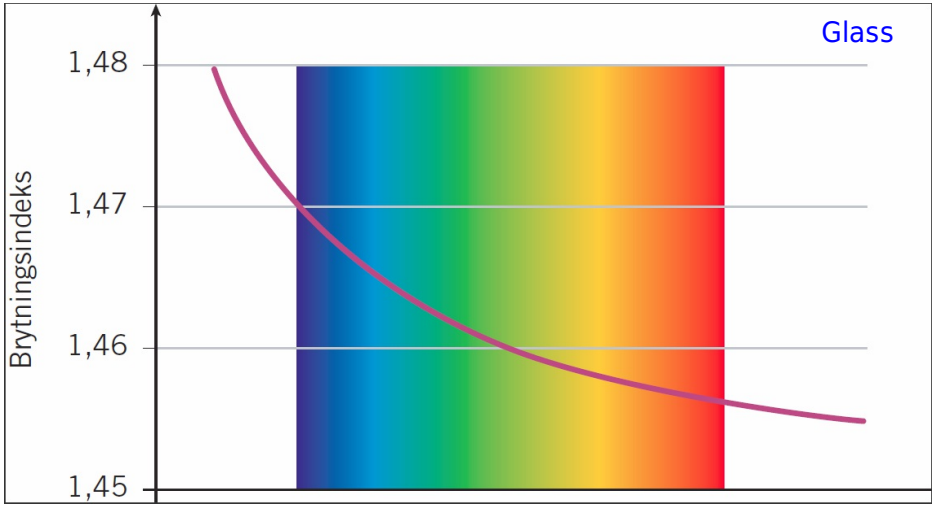


$$n_1 \sin\alpha_{gr} = n_2 \sin 90° = 1 \quad (n_2 = 1)$$

$$\sin\alpha_{gr} = \frac{1}{n_1} = 0,75...$$

$$\alpha_{gr} = 48,8°$$

Dispersjon: Brytningsindeksen avhenger av bølgelengden



Ved spredning mot små partikler blir kortbølget lys spredt mest effektivt.