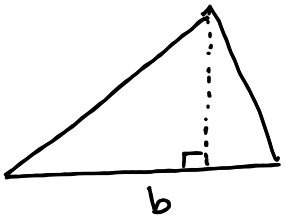
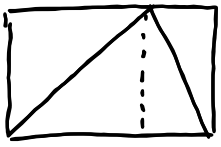
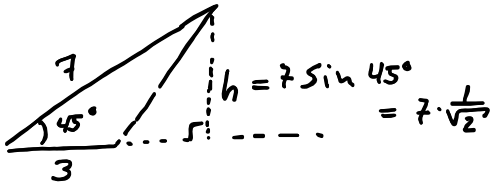
9.7 Arealsetningen



Arealet er $A = \frac{b \cdot h}{2}$

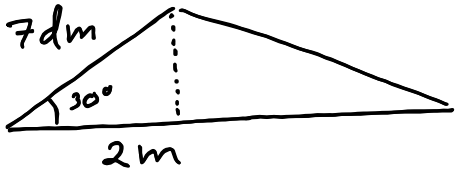


Eksempler



Hva er arealet?

Arealet er $\frac{3 \cdot 7 \cdot 1/\sqrt{2}}{2} = \frac{21}{2\sqrt{2}} \sim 7.42$



Hva er arealet i cm^2, dm^2 og m^2?

(Husk: $\sin(30°) = 1/2$)

$1m = 10dm = 100cm$

$A = \frac{2m \cdot (7dm \cdot \sin 30°)}{2}$ (høyden)

$= \frac{7}{2} m \cdot dm$

$= \frac{7}{2} \cdot \frac{1}{10} m^2 = 0.35 m^2$

$= 3.5 (10dm) \cdot dm = 35 dm^2$

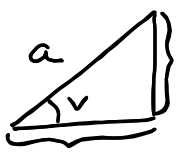
$= 35 \cdot 100 cm^2 = \underline{3500 cm^2}$

$1dm = \frac{1}{10} m$

$1m = 10dm$

$(1dm)^2 = (10cm)^2$

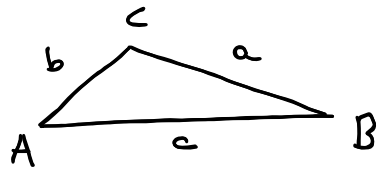
$1dm^2 = 100cm^2$



arealet er: $\frac{1}{2} \cdot a^2 \sin v \cdot \cos v$

arealet er størst når $v = 45°$ ...

Sinussetningen



Arealet til trekanten er:

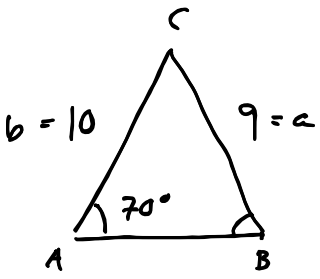
$\frac{1}{2} b \cdot c \cdot \sin A = \frac{1}{2} a \cdot c \cdot \sin B = \frac{1}{2} a \cdot b \sin C$

vi deler med $\frac{1}{2} a \cdot b \cdot c$

$$\frac{b \cdot c \sin A}{a \cdot b \cdot c} = \frac{a \cdot c \cdot \sin B}{a \cdot c \cdot b} = \frac{a \cdot b \sin C}{a \cdot b \cdot c}$$

Dette gir sinussetningen:

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

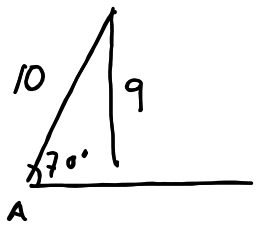


Hva er B?

$$\frac{\sin B}{b} = \frac{\sin A}{a}$$

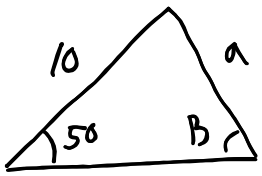
$$\sin B = \frac{b}{a} \cdot \sin A$$

$$= \frac{10}{9} \cdot \sin 70° \sim 1.044..$$



Det finnes ingen trekant med disse egenskapene

Ny versjon (hvor det er løsning)



Hva er B?

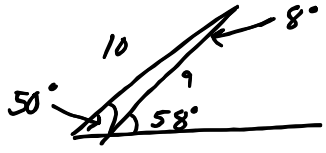
sinussetningen

$$\sin B = \frac{b}{a} \sin A$$

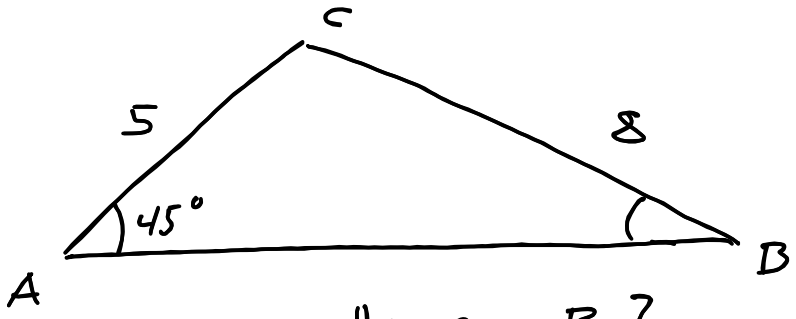
$$= \frac{10}{9} \sin(50°) \sim 0.85$$

$B = \arcsin(0.85) \sim 58°$

eller $B = 180° - \arcsin(0.85) \sim 122°$



oppg



Hva er B ?

$\frac{\sin A}{a} = \frac{\sin B}{b}$ så $\sin B = \frac{b}{a} \cdot \sin A$

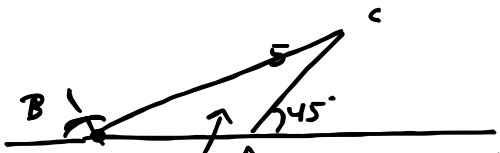
$= \frac{5}{8} \cdot \frac{1}{\sqrt{2}}$.

Løsningene for $0° < B < 180°$

er $\arcsin\left(\frac{5}{8\sqrt{2}}\right) \sim \underline{26.2°}$ Løsning (figuren ovenfor)

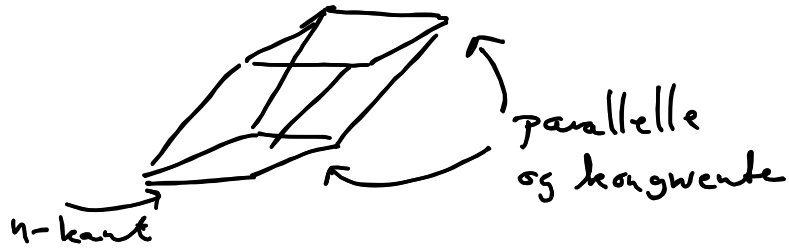
og $180° - \arcsin\left(\frac{5}{8\sqrt{2}}\right) = 180° - 26.2° = 153.8°$

↗ ikke en løsning

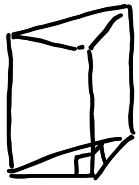


vinkel A er ikke lengen 45°!

9.5 Prismer og sylindere

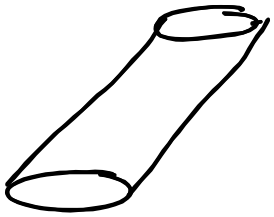


skeivt prisme

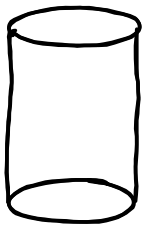


rett prisme

sylinder



skeiv sylinder



rett sylinder

Volumet til prismer og sylindere

$$V = G \cdot h$$

G areal til grunnflate

Eksempel:

Hva er volumet?

grunnflate.

$$G = 4 \cdot 3 \cdot \overbrace{\sin(30°)}^{1/2}\ \text{cm}^2 = 6\,\text{cm}^2$$

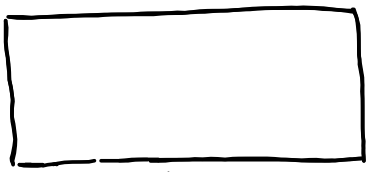
$$V = G \cdot h = 6\,\text{cm}^2 \cdot 5\,\text{cm} = \underline{30\,\text{cm}^3}$$

I liter: $1\,\text{Liter} = 1\,\text{dm}^3 = (10\,\text{cm})^3 = 1000\,\text{cm}^3$

$$V = 30\,\text{cm}^3 \cdot \frac{1\,\text{L}}{1000\,\text{cm}^3} = \underline{0.030\ \text{Liter}}$$

overflaten til en sylinder uten topp og bunn:

kutter sylinderen og bretter ut



9.6 P problem med pennen.

dvle vesken.