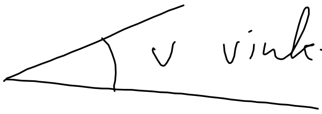
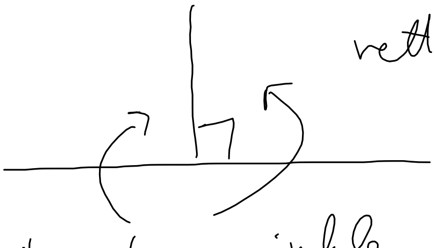
9 Trigonometri og geometri



v vinkel

180°

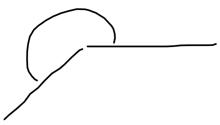


rett vinkel

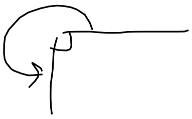
$90^\circ \left(= \frac{180^\circ}{2}\right)$

Like store vinkler

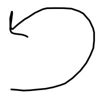
Utvider vinkelbegrepet



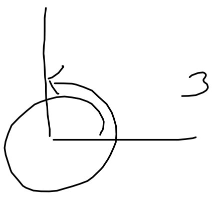
$180^\circ + 90^\circ = 270^\circ$



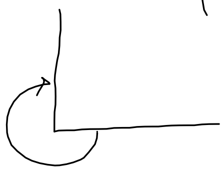
+ positiv



− negativ retning

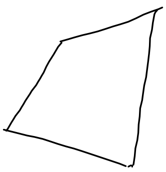


$360^\circ + 90^\circ = 450^\circ$



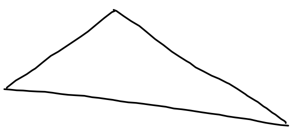
-270°

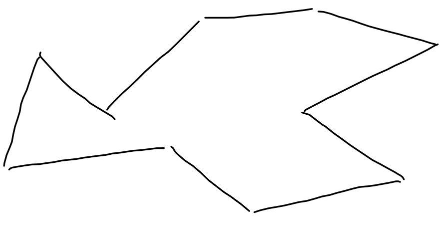
4 kant



4 rette sider

3 - kant

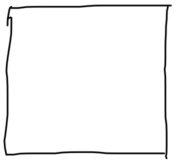




10 - kant

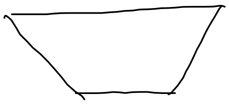
rektangel

alle vinklene
er rette



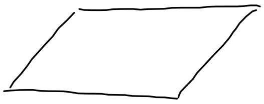
kvadrat

rektangel
hvor alle
sidene er
like lange



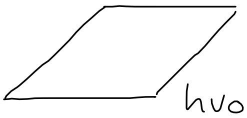
trapes

to parallelle sider



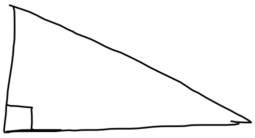
parallellogram

parvis parallelle sider

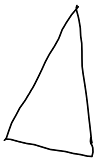


rombe

parallellogram
hvor sidene
er like lange

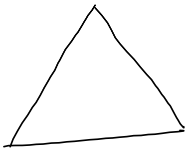


rettvinkla
trekant



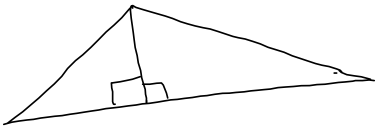
likebeina
trekant

2 sider like
lange

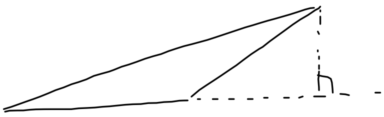


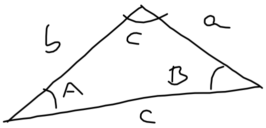
likesida
trekant

alle sidene
er like lange



Alle trekanter er bygd
opp av to rettvinkla
trekanter.

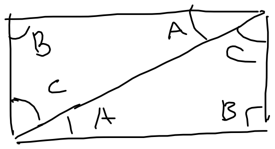




vinkler skrives også som $\angle A$

summen av vinklene i en trekant
er alltid 180°

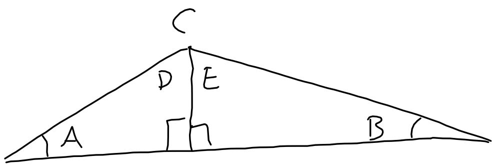
$$A + B + C = 180^\circ$$



$A + C = 90°$

$B = 90°$

$A + B + C = 180°$



$A + D = 90°$

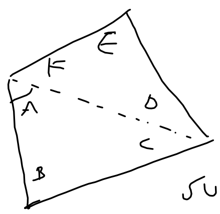
$B + E = 90°$

$A + \underbrace{D + E}_{C} + B = 90° + 90°$

Så $\underline{A + B + C = 180°}$

Summen av vinklene i 4-kanter er $360°$

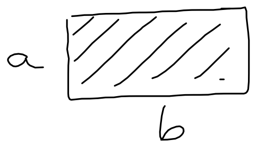
n-kanter er $(n-2)\cdot 180°$



$D + E + F = 180°$

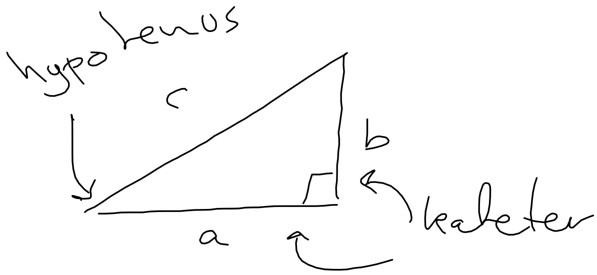
$A + B + C = 180°$

summen $(A+F) + B + (C+D) + E = 360°$

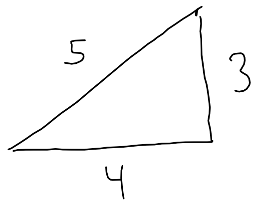


areal a·b

Pytagoras sin sats

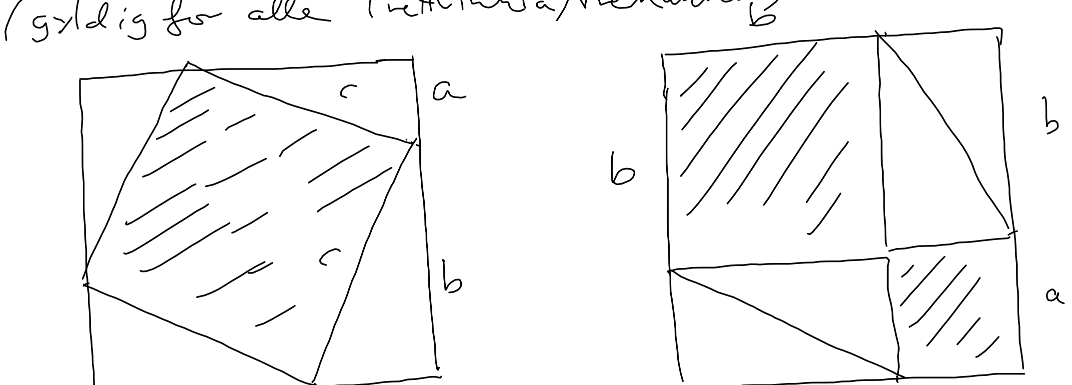


$$a^2 + b^2 = c^2$$



$$3^2 + 4^2 = 9 + 16 = 25 = 5^2$$

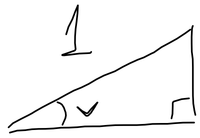
Geometrisk bevis for Pytagoras sin sats.
(gyldig for alle (rettvinkla) trekanter)



Flytter dei 4 trekantene i kvadratet

Arealet inni dette store kvadratet og utefor trekantene er likt i begge tilfeller. så $c^2 = a^2 + b^2$

Sinus og cosinus (kosinus)



sin(v) motstående katet $0° \leq v \leq 90°$

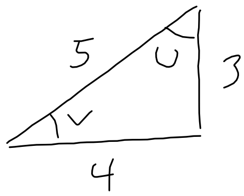
cos(v) hosliggende katet

$\sin(v) = \dfrac{\text{motstående katet}}{\text{hypotenus}}$ (lengden av ...)

$\cos(v) = \dfrac{\text{hosliggende katet}}{\text{hypotenus}}$

$\cos(0°) = 1$ $\sin(0°) = 0$

$\cos(90°) = 0$ $\sin(90°) = 1$



$\cos(v) = \frac{4}{5} = 0.8 = \sin(u)$

$\sin(v) = \frac{3}{5} = 0.6 = \cos(u)$

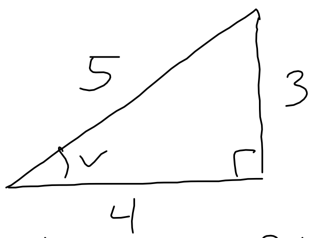
sin(v) og cos(v) er mellom 0 og 1 ~~for~~ $0° \leq v \leq 90°$.

For alle $0 \leq x \leq 1$ så finnes det en vinkel $0° \leq v \leq 90°$ slik at $\sin(v) = x$. Det er bare en slik vinkel i intervallet $[0°, 90°]$.

Denne vinkelen skrives $\sin^{-1}(x)$ eller $\underline{\arcsin(x)}$

Dette er inversfunksjonen til sin $[0°, 90°]$.

Tilsvarende har vi $\cos^{-1}(x)$ eller $\arccos(x)$.



$\sin v = \frac{3}{5} = 0.6$

$V = \arcsin(0.6) = 36.86\ldots^\circ$

(0.6 … da er kalkulatoren stilt inn på radianer.