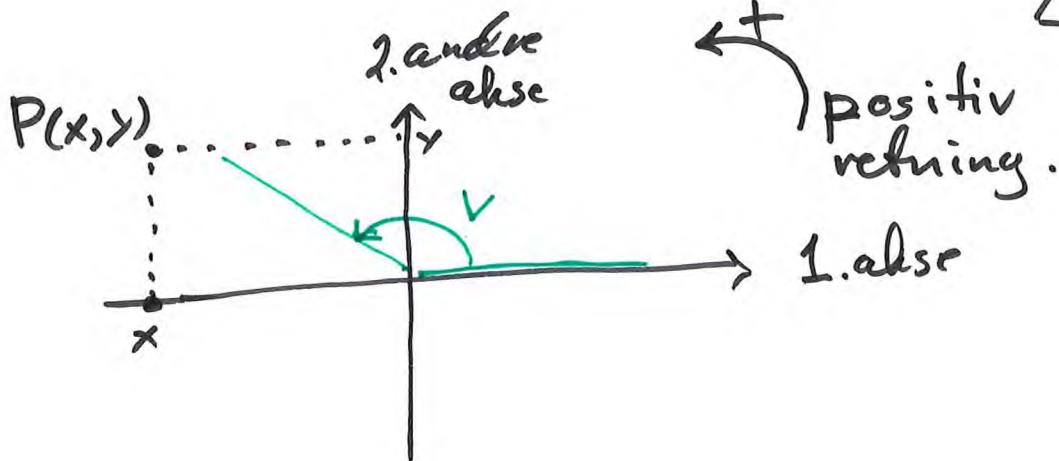
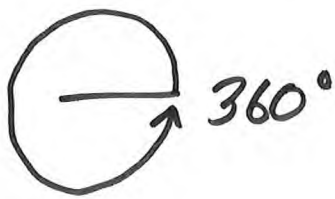


14jan
25

10 B (F)

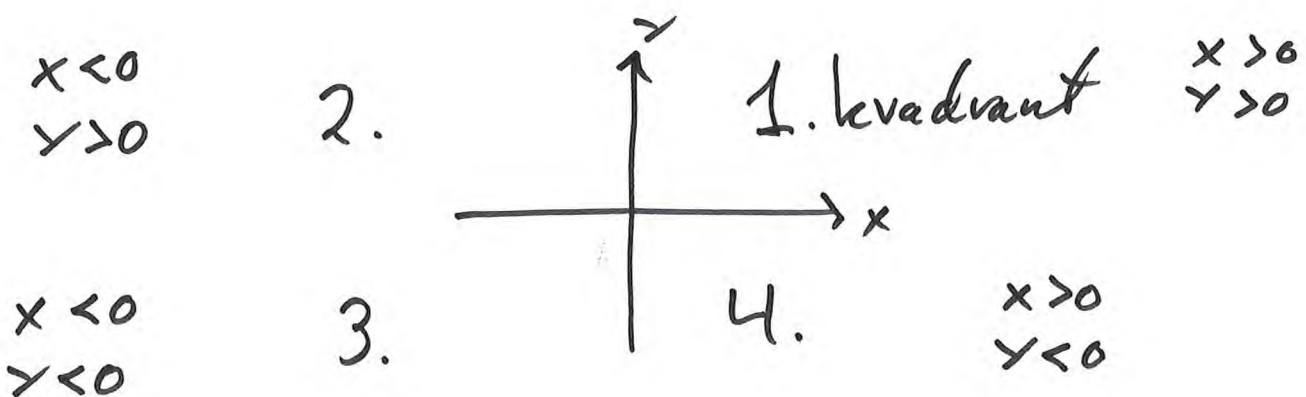
Generelle vinkler



$$400^\circ = 360^\circ + 40^\circ \quad \text{2. omlop.}$$

$$\begin{aligned} -1000^\circ &= 3 \cdot (-360^\circ) + 80^\circ \\ &= 2(-360^\circ) - 280^\circ \end{aligned} \quad \left(\begin{array}{l} 360 \cdot 3 \\ = 900 + 180 \\ = 1080 \end{array} \right)$$

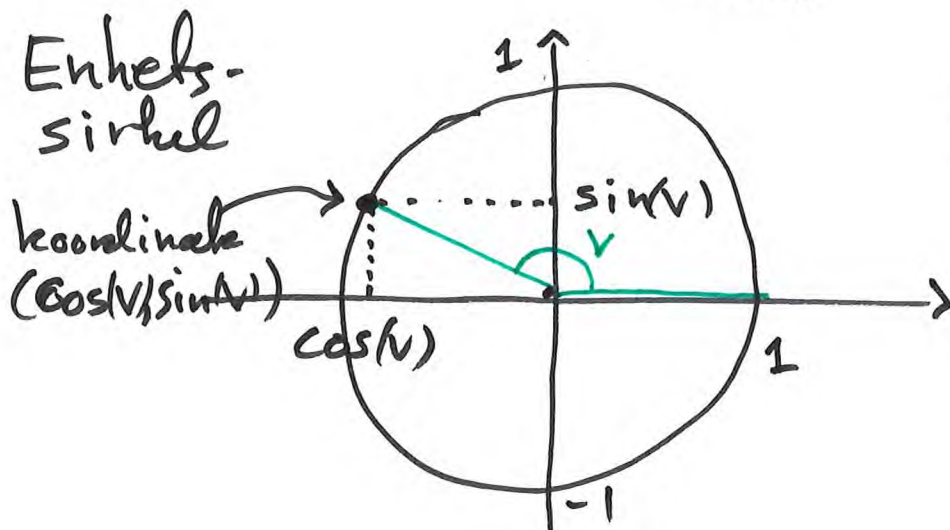
Detta er i det 3. negative omlopet.



Sin, cos og tan
for generelle vinkler.



$$\sin v \quad 0 \leq v \leq 90^\circ$$



senker i origo
radius lik 1

Laget
figur
i Geogebra

$$\begin{aligned} -1 &\leq \sin(v) \leq 1 \\ -1 &\leq \cos(v) \leq 1 \end{aligned}$$

for alle v

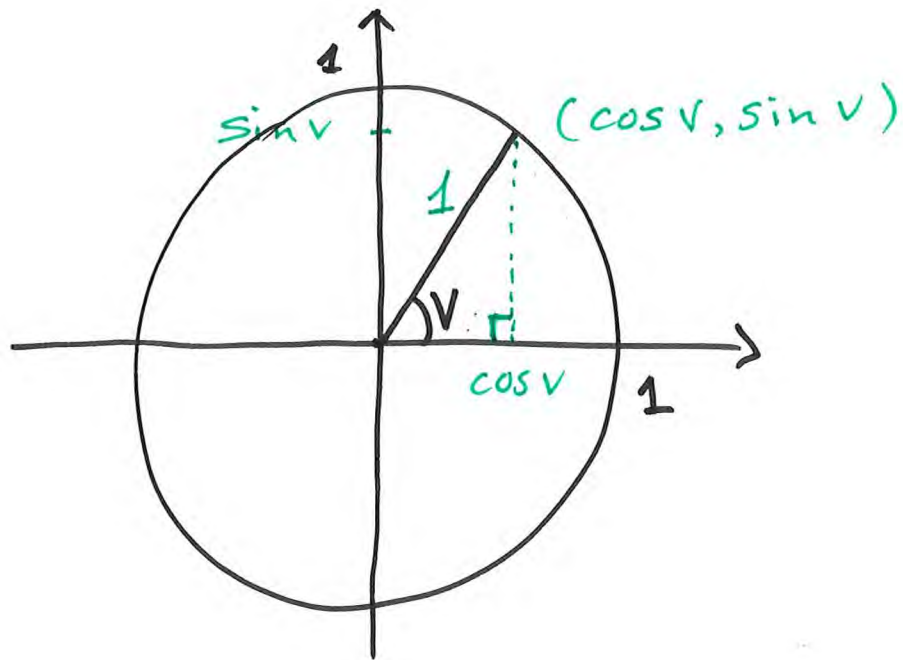
$$\begin{aligned} \cos(v + 360^\circ \cdot n) &= \cos(v) \\ \sin(v + 360^\circ \cdot n) &= \sin(v) \end{aligned}$$

for alle v
heltall n .

Noen verdier

$$\begin{aligned} \cos(180^\circ) &= -1 \\ \cos(270^\circ) &= 0 \\ \cos(-45^\circ) &= \cos(45^\circ) \\ &= 1/\sqrt{2} \end{aligned}$$

$$\begin{aligned} \sin(180^\circ) &= 0 \\ \sin(270^\circ) &= -1 \\ \sin(-45^\circ) &= -\sin(45^\circ) \\ &= -1/\sqrt{2} \end{aligned}$$



$$\tan v = \frac{\sin v}{\cos v} \quad (\cos v \neq 0)$$

Stignings tallet
til linjesegmentet
fra $O = (0,0)$ til
 $(\cos(v), \sin(v))$.

$$v \neq 90^\circ + 360^\circ \cdot n$$

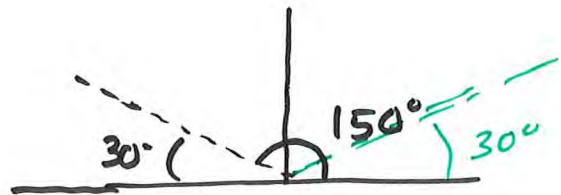
$$v \neq 270^\circ + 360^\circ \cdot n$$

$$n \in \mathbb{Z}$$

$$\tan(v + 180^\circ \cdot n) = \tan v$$

alle v og heltall n .

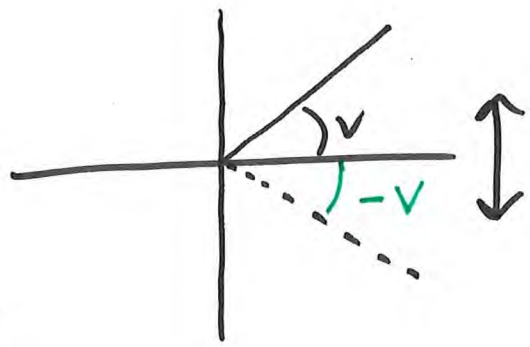
$$\begin{aligned} \tan(150^\circ) &= \frac{\sin(150^\circ)}{\cos(150^\circ)} \\ &= \frac{\sin(30^\circ)}{-\cos(30^\circ)} \end{aligned}$$



spegler om y -aksen

$$= -\frac{1/2}{\sqrt{3}/2} = \underline{\underline{-\frac{1}{\sqrt{3}}}}$$

- spegling om x-aksen

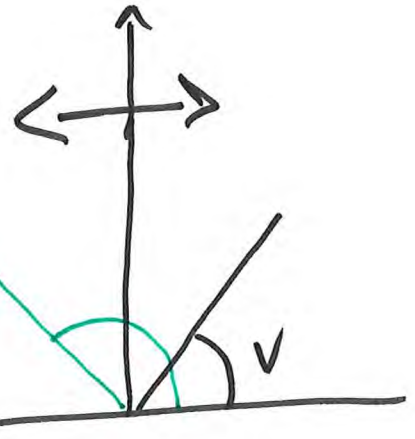


$$\cos(-v) = \cos(v)$$

$$\sin(-v) = -\sin(v)$$

$$\tan(-v) = -\tan(v)$$

- spegling om y-aksen



$$\cos(180^\circ - v) = -\cos(v)$$

$$\sin(180^\circ - v) = \sin(v)$$

$$\tan(180^\circ - v) = -\tan(v)$$

- spegling om linjen

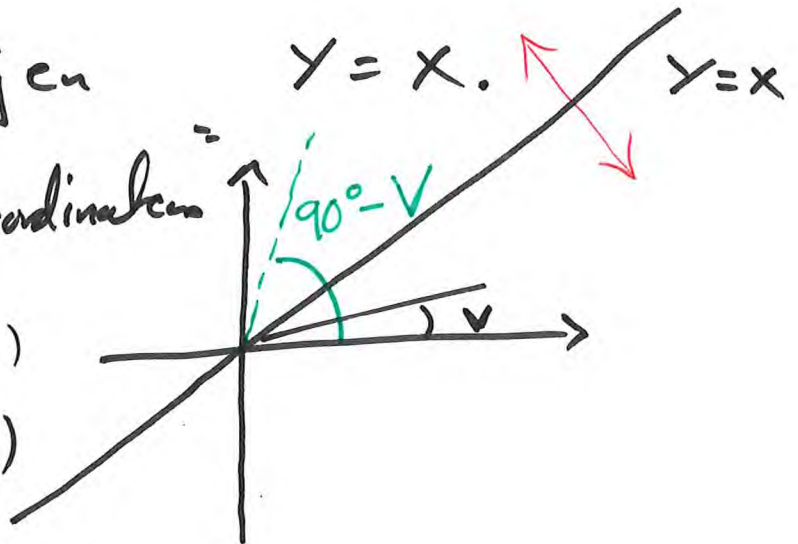
$y = x$

Bytter om x- og y-koordinater

$$\cos(90^\circ - v) = \sin(v)$$

$$\sin(90^\circ - v) = \cos(v)$$

$$\tan(90^\circ - v) = \frac{1}{\tan(v)}$$



ν : benytter pythagoras sin subs.

$$\cos^2 \nu + \sin^2 \nu = 1$$

$$(\cos \nu)^2 + (\sin \nu)^2 = 1$$

$$\cos^2 \nu = 1 - \left(\frac{2}{3}\right)^2$$

$$= 1 - \frac{4}{9} = \frac{5}{9}$$

$$\cos(\nu) = \pm \frac{\sqrt{5}}{3}$$

ν i andet kvadrant så $\cos(\nu) < 0$

$$\cos(\nu) = -\frac{\sqrt{5}}{3}$$

*

$$\tan(\nu) = \frac{\sin(\nu)}{\cos(\nu)} = \frac{2/3}{-\sqrt{5}/3} = \frac{-2}{\sqrt{5}}$$

*

$$\cos(\nu + 180^\circ) = \cos(180^\circ - (-\nu))$$

spegling om
x-aksen

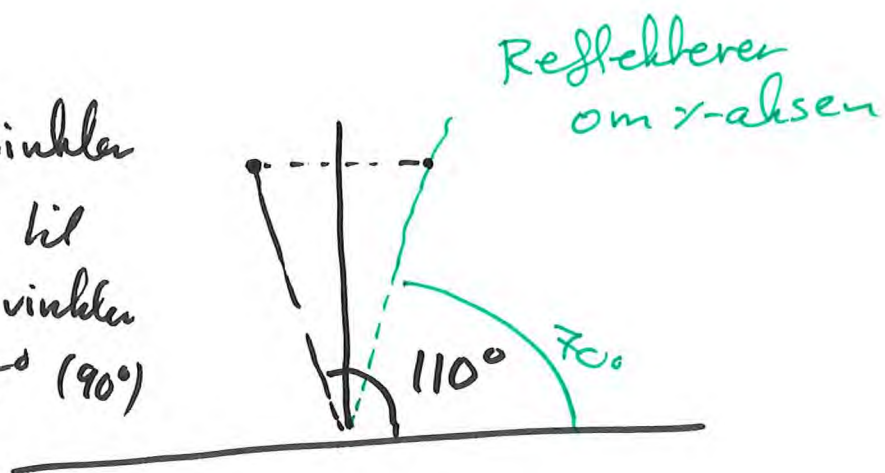
$$= -\cos(-\nu)$$

spegling
om x-akse

$$= -\cos(\nu)$$

$$= -\left(-\frac{\sqrt{5}}{3}\right) = \frac{\sqrt{5}}{3}$$

Sin og cos
til vilkårlige vinkler
kan reduseres til
sin og cos for vinkler
mellom 0° og 45° (90°)



$$110^\circ = 90^\circ + 20^\circ$$

$$\sin(110^\circ) = \sin(70^\circ) = 0.94\dots$$

$$\cos(110^\circ) = -\cos(70^\circ) = -0.34\dots$$

oppg. En vinkel v er slik at

$\sin v = \frac{2}{3}$ og vinkelen
ligger i 2. kvadrant.

* Hva er $\cos v$ (gi svaret eksakt)

* $\tan v$

* $\cos(v + 180^\circ)$.