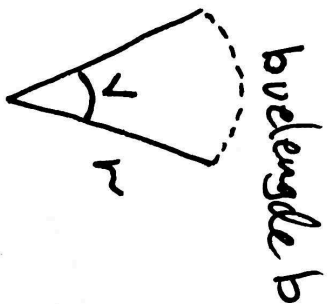


14.01

26

10 F Radianer.



buelengde b

$\frac{b}{r}$  vinkelen i radianer.

$$\frac{b}{r} = \nu, \quad b = r \cdot \nu$$



$$360^\circ = \frac{2\pi r}{r} = 2\pi \text{ radianer}$$

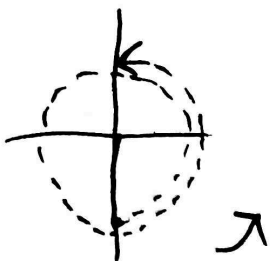


$$\frac{180^\circ}{1} = \frac{\pi r}{r} = \underline{\pi \text{ radianer}}$$

$$90^\circ = \frac{\pi}{2} \text{ radianer}$$



$$360^\circ + 180^\circ = 2\pi + \pi = 3\pi \text{ radianer}$$



$$-45^\circ = -\frac{\pi}{4} \text{ radian}$$

$$\text{vinkel i grader} = \frac{180^\circ}{\pi} \cdot \text{vinkel i radianer}$$

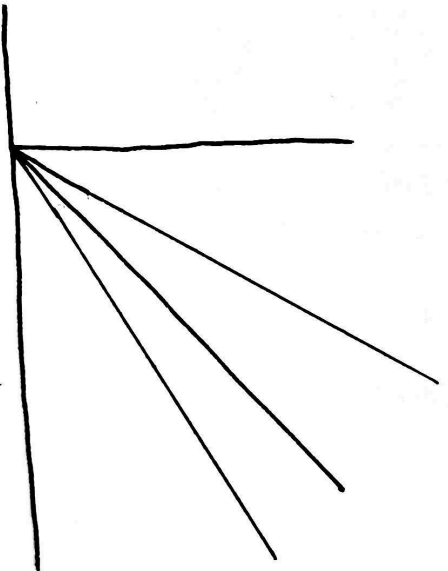
$$\text{vinkel i radianer} = \frac{\pi}{180^\circ} \cdot \text{vinkel i grader}$$

$$60^\circ = \frac{\pi}{180^\circ} \cdot 60^\circ = \frac{\pi}{3} \text{ radianer}$$

$$-70^\circ = \frac{\pi}{180^\circ} (-70^\circ) = -\frac{\pi \cdot 7}{18} = -\frac{7\pi}{18}$$

$$1 \text{ rad} = \frac{180^\circ}{\pi} \cdot 1 = \frac{180^\circ}{\pi} \approx 57.295\dots^\circ$$

$$\pi^\circ = \frac{\pi}{180^\circ} \pi^\circ = \frac{\pi^2}{180}$$



$$30^\circ = \frac{\pi}{6}$$

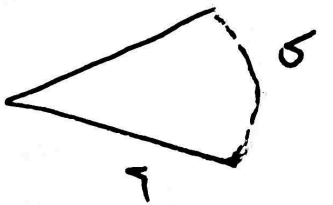
$$45^\circ = \frac{\pi}{4}$$

$$60^\circ = \frac{\pi}{3}$$

$$90^\circ = \frac{\pi}{2}$$

$$\underline{180^\circ = \pi}$$

Simulsegment



$$A_{\text{areal}} = \frac{r \cdot b}{2}$$

$$b = r \cdot \nu$$

$$A_{\text{areal}} = \underline{\underline{\frac{1}{2} r^2 \cdot \nu}}$$

$$\sin\left(\frac{\pi}{4}\right) = \cos\left(\frac{\pi}{4}\right) = \frac{1}{\sqrt{2}} \sim 0.707$$

$$\sin\left(\frac{\pi}{6}\right) = \frac{1}{2} = \cos\left(\frac{\pi}{3}\right)$$

$$\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2} = \cos\left(\frac{\pi}{6}\right)$$

$$\sin\left(\frac{\pi}{180^\circ} \cdot x\right) \quad x \text{ vinkel i grader.}$$

oppg.

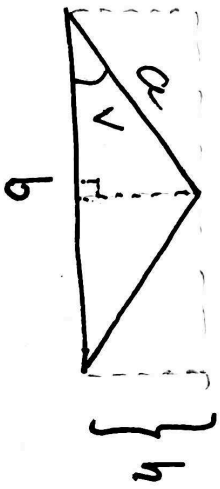
$\frac{2\pi}{5}$  hva er vinkelen i grader?

$$\frac{2\pi}{5} \cdot \frac{180^\circ}{\pi} = \frac{2}{5} \cdot 10 \cdot 18^\circ = 2 \cdot \frac{10}{5} \cdot 18^\circ = 2 \cdot 2 \cdot 18^\circ = \frac{72^\circ}{1}$$

$$35^\circ = 35^\circ \cdot \frac{\pi}{180} = \frac{7 \cdot 5}{18 \cdot 10} \pi = \frac{7}{18 \cdot 2} \pi = \frac{7}{36} \pi$$

# 10c Arealsträngen

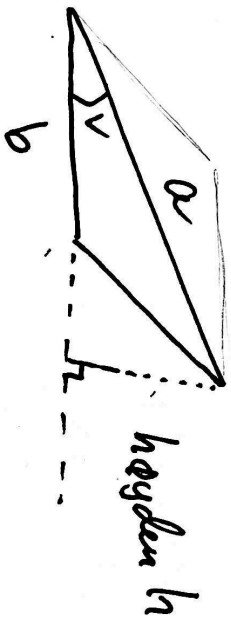
$$\sin V = \frac{h}{a}$$



Areal  $\frac{b \cdot h}{2}$

höjden  $h = a \sin V$

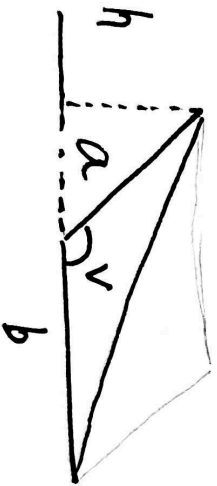
$$A = \frac{1}{2} ab \sin V$$



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

$$= \frac{b(a \cdot \sin V)}{2}$$

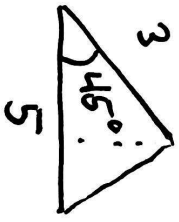
$$A = \frac{1}{2} ab \sin V$$



$$A = \frac{1}{2} b \cdot h$$

$$h = a \sin (180^\circ - V) = a \sin V$$

$$A = \frac{1}{2} b \cdot a \sin V$$



arealet er

$$\frac{5 \cdot 3 \cdot \sin(45^\circ)}{2}$$

$$= \frac{5 \cdot 3}{2} \frac{1}{\sqrt{2}} = \frac{15}{2\sqrt{2}}$$



Arealet er lik 6.  
Hva er vinkelen  $V$  mellom sidene  
av lengde 4 og 6.

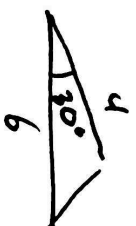
$$A = \frac{6 \cdot 4 \sin V}{2} = 6$$

$$\sin V = \frac{6}{6 \cdot 2} = \frac{1}{2}$$

$$\sin^{-1}\left(\frac{1}{2}\right) = \arcsin\left(\frac{1}{2}\right) = 36^\circ$$



to løsninger :



$$\sin(V) = \frac{1}{2}$$

har løsningene

$$30^\circ \text{ og } 150^\circ = 180^\circ - 30^\circ$$

for vinkler mellem

$$0^\circ \text{ og } 180^\circ.$$

OPP9.

Find trekanterne

1 og 4

med to sider og længde

med areal :

a)

$$A = 2$$

b)

$$A = 3$$

c)

$$A = \sqrt{2}.$$

b) Har ingen løsning

$$A = \frac{1 \cdot 4 \sin V}{2} = 2 \sin V \leq 2 \text{ for alle } V.$$

$A = 3$  kan ikke realiseres.

a)

$$A = \frac{1 \cdot 4 \sin V}{2} = 2 \sin V = 2$$

$$\sin V = 1$$

$$V = 90^\circ$$

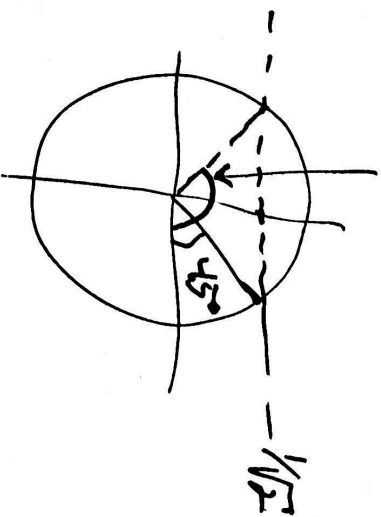
$$180^\circ - 45^\circ = 135^\circ$$



c)

$$A = \frac{1 \cdot 4}{2} \sin V = \sqrt{2}$$

$$\sin V = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$$



$$V = 45^\circ$$



$$V = 135^\circ$$

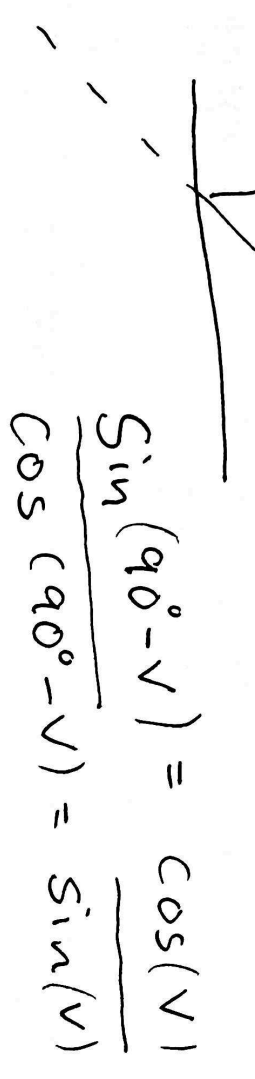


10.43

Pring.

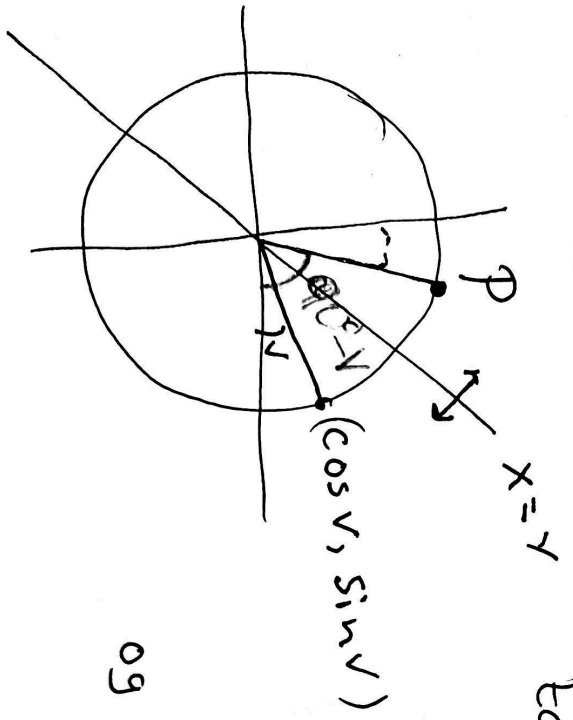
b) Vis  $\tan(90^\circ - V) = \frac{1}{\tan V}$  ( $\sin V \neq 0$ )  
( $\cos V \neq 0$ )

$(x, y)$  reflection.  $X=Y$  virtual v sends  $90^\circ - V$   
by the x og y coordinate



$$\frac{\sin(90^\circ - V)}{\cos(90^\circ - V)} = \frac{\cos V}{\sin V}$$

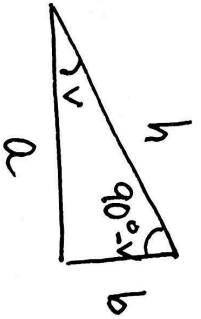
$$\tan(90^\circ - V) = \frac{\cos V}{\sin V} = \frac{1}{\sin V / \cos V} = \frac{1}{\tan V} = \cot V$$



og  $P(\cos V, \sin V)$  Reflection on  $X=Y$   
 $P(\sin V, \cos V)$   
 $P(\cos(90^\circ - V), \sin(90^\circ - V))$

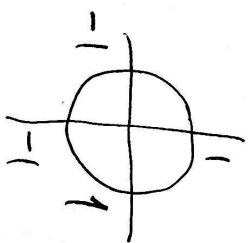
→

$$0^\circ < V < 90^\circ$$



$$\tan V = \frac{b}{a}$$

$$\tan(90^\circ - V) = \frac{a}{b} = \frac{1}{b/a} = \frac{1}{\tan V}$$



$$-1 \leq \sin V \leq 1$$

$$\cos V$$

største og mindste  
værdi vil

a)  $4 \sin V$  er  $-4$  og  $4$

b)  $-6 \cos V$  er  $-6$  og  $6$

c)  $2 \sin(V) + 1$  er  $-1$  og  $3$

d)  $(\cos V)^2 + 1$  er  $1$  og  $2$ .  
 (når  $\cos V = 0$ ) (når  $\cos V = \pm 1$ )

10.44

Oppg 10.53 a)  $\sin 35^\circ > \sin 33^\circ$

$\sin(x)$  voksende  
i  $[-90^\circ, 90^\circ]$

