

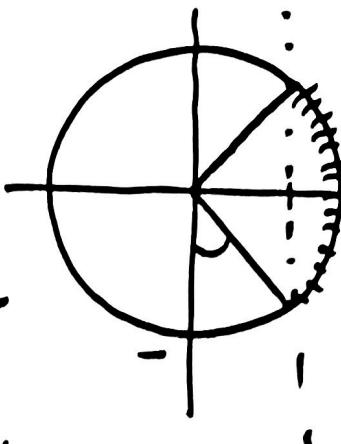
Trigonometriske uligheder

$$\sin v > \frac{1}{\sqrt{2}}$$

卷之三

$$V = \frac{\pi}{4} \cdot 0.9$$

$\forall \in \wedge \frac{\pi}{4}, \frac{3\pi}{4}$



Lösungen

The diagram illustrates the unit circle on a Cartesian coordinate system. The horizontal axis is labeled $\cos v$ and the vertical axis is labeled $\sin v$. A point on the circle is projected onto the axes, forming a right-angled triangle. The hypotenuse of this triangle is labeled $1/\sqrt{2}$. The angle v is shown between the positive x-axis and the radius to the point on the circle. The angle $2\pi - v$ is also indicated.

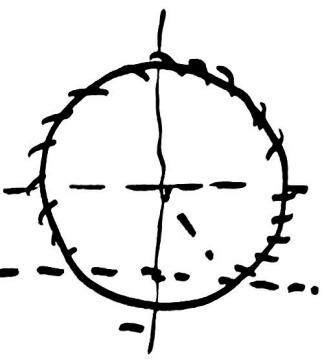
$$v \in [0, 2\pi]$$

$$\cos v < \frac{\sqrt{3}}{2}$$

$$\cos v = \frac{\sqrt{3}}{2}$$

Lösungen zu $\cos v = \frac{\sqrt{3}}{2}$

$$\frac{\pi}{6}, \frac{11\pi}{6}$$



$$\sqrt{3}/2$$

$$v \in \left[\frac{\pi}{6}, \frac{11\pi}{6} \right)$$

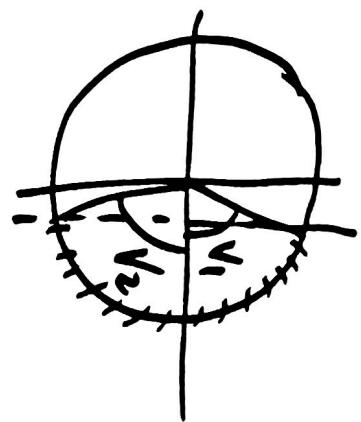
Lösungen zu

$$\cos v \geq 0.2$$

$$v \in [0, 2\pi]$$

$$v_1 = \arccos(0.2) \approx 78.463^\circ = 1.369$$

$$\text{andere Lösung für } \cos v = 0.2 \\ \text{ist } v_2 = 2\pi - v_1 = 4.9147 \dots$$



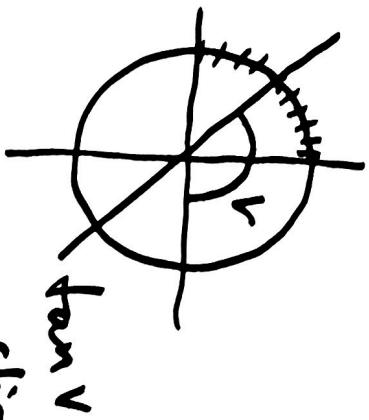
$$v \in [0, v_1] \cup [v_2, 2\pi]$$

$$v \in [0, 2\pi].$$

$$\tan v \leq 0$$

$$v \in \{0\} \cup \left(\frac{\pi}{2}, \pi \right] \cup \left[\frac{3\pi}{2}, 2\pi \right]$$

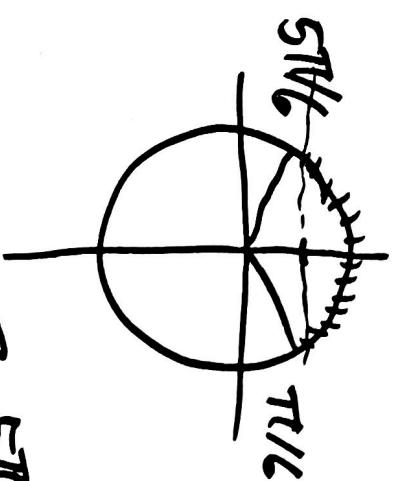
opg.



$\tan v < 0$
signs-
fallt w[egen]

$$x \in [0, 2\pi] /$$

$$\sin(2x) = 2 \underline{\sin x \cos x}$$



$$\sin x \cos x > \frac{1}{4}$$

$$|o2|$$

$$\frac{1}{2} \sin(2x) > \frac{1}{4}$$

$$\sin(2x) > \frac{1}{2}$$

$$x = \sqrt{\nu}$$

$$\sqrt{\nu} = 2x \quad x = \sqrt{\nu}$$

$$\sqrt{\nu} \in \left< \frac{\pi}{6}, \frac{5\pi}{6} \right> \cup \left< \frac{13\pi}{6}, \frac{17\pi}{6} \right>$$

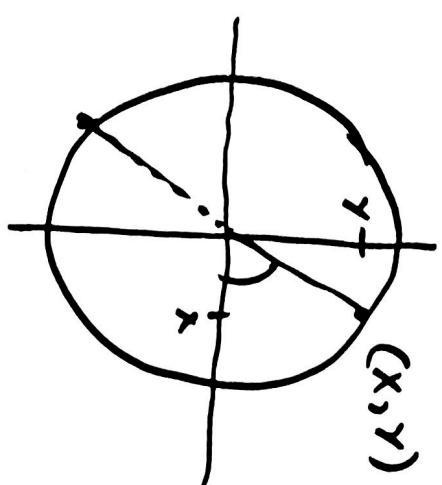
$$\underline{\sin(\nu)}$$

$$x \in \left\langle \frac{\pi}{12}, \frac{5\pi}{12} \right\rangle \cup \left\langle \frac{13\pi}{12}, \frac{17\pi}{12} \right\rangle$$

$$\sin x > \cos x$$

$$x \in [0, 2\pi]$$

Metode 1 : $x \in \left\langle \frac{\pi}{4}, \frac{5\pi}{4} \right\rangle$ ved inspektion
av enhetscirkelen.



Metode 2 :

$$\cos x > 0 : \text{Deler med} \quad \cos x$$

$$\tan x > 1 \\ \left\langle \frac{\pi}{4}, \frac{\pi}{2} \right\rangle$$

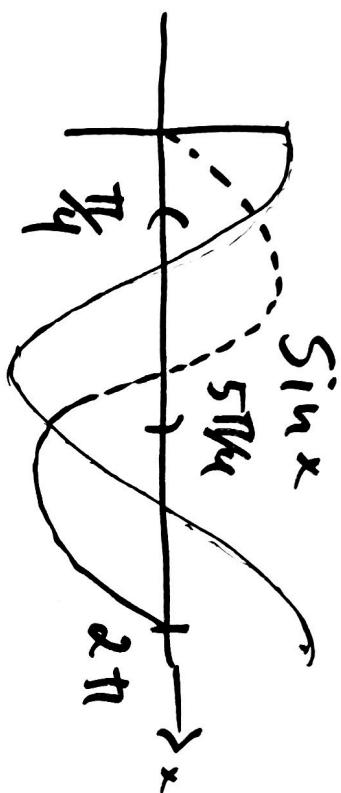
$$\cos x < 0 \quad -\pi - \tan x < 1$$

$$< \frac{\pi}{2}, \frac{5\pi}{4} \rangle$$

$$\cos x = 0. \text{ lösning är } \sin x = 1 \quad : \quad x = \pi/2$$

Delte gir tilsammen løsningene $\left\langle \frac{\pi}{4}, \frac{5\pi}{4} \right\rangle$

Metode 3



$$x \in [0, 2]$$

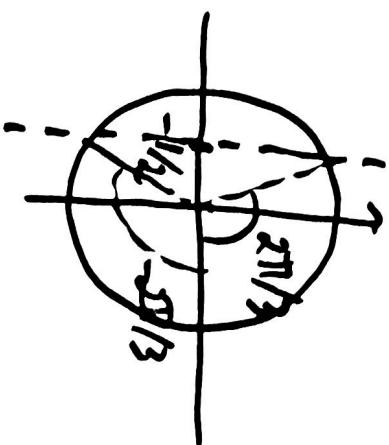
$$\cos(\pi x) + \frac{1}{2} \geq 0$$

Opg.

$$\text{La } v = \pi x. \text{ Da er } x = \frac{v}{\pi}$$

$$v \in [0, 2\pi]$$

$$\cos(v) \geq \frac{-1}{2}.$$



$$v_1 = 2\pi/3$$

$$v_2 = 4\pi/3 \left(= 2\pi - \frac{2\pi}{3}\right)$$

$$x \in [0, \frac{2}{3}] \cup [\frac{4}{3}, 2]$$

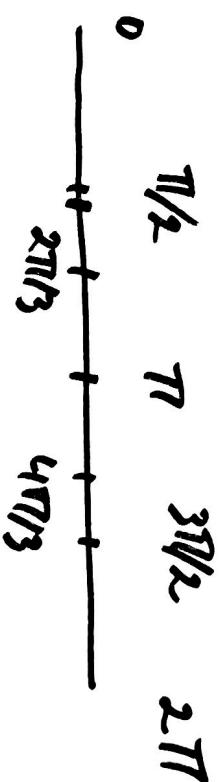
$$2 \sin x + \tan x \geq 0$$

$$\tan x = \frac{\sin x}{\cos x}$$

$$\sin x \left(2 + \frac{1}{\cos x} \right) \geq 0$$

$$2 \sin x \frac{\cos x + \frac{1}{2}}{\cos x} \geq 0$$

Fordelingsstykke



$$2 \sin x$$

$$1/\cos x$$

$$\cos x + \frac{1}{2}$$

$$2 \sin x \frac{\cos x + \frac{1}{2}}{\cos x}$$

$$Løsningsmængde = [0, \frac{\pi}{2}] \cup [\frac{2\pi}{3}, \pi] \cup [\frac{4\pi}{3}, \frac{3\pi}{2}] \cup \{2\pi\}$$

Øving

$$10.75 \quad c) \quad 4\sin^2x - 4\sin x \cos x + 4\cos^2x = 1$$

$$\begin{aligned} & 4(\underbrace{\sin^2x + \cos^2x}_1) - 4\sin x \cos x = 1 \\ & (-4\sin x \cos x = 1 - 4 = -3) \end{aligned}$$

$$\sin 2x =$$

$$2\sin x \cos x$$

$$2\sin(2x) = 3$$

$$\sin(2x) = \frac{3}{2} = 1.5$$

ingen reelle løsninger for x .

All emne er del med \cos^2x ($\cos x \neq 0$ for løsninger)

$$4\tan^2x - 4\tan x + 4 = \frac{1}{\cos^2x} = \tan^2x + 1$$

$$3\tan^2x - 4\tan x + 3 = 0$$

La $\varphi = \tan x$

$$3\varphi^2 - 4\varphi + 3 = 0$$

ingen reelle løsninger.

fordi diskriminanten er lik $(-4)^2 - 4 \cdot 3 \cdot 3 = -20 < 0$

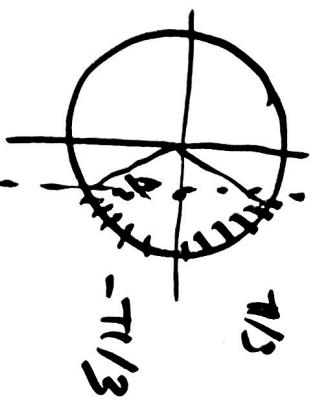
$$2 \cos x - 1 > 0$$

$$x \in [-\pi, \pi]$$

$$2 \cos x > 1$$

$$\cos x > \frac{1}{2}$$

$$\cos x = \frac{1}{2} \quad x = \pm \frac{\pi}{3}$$



$$\cos x = \frac{1}{2}$$

$$x = \pm \frac{\pi}{3}$$

Lösningene är

$$x \in \underline{(-\pi/3, \pi/3)}.$$

10.35

Finn $v_1, v_2 \neq 120^\circ$, s.likat $\sin(v_i) = \sin(20^\circ)$

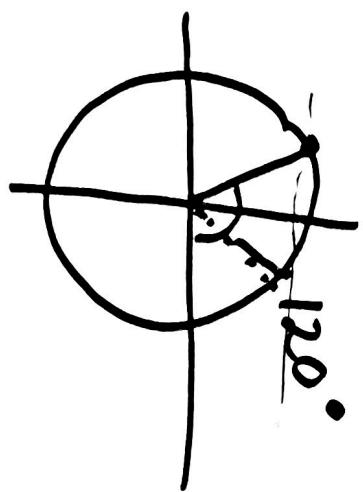
Reflekterer om y -aksen

$$180^\circ - 120^\circ = 60^\circ$$

$$\underline{v_1 = 60^\circ}$$

Lägger et heltomtg.

$$\underline{v_2 = 480^\circ}$$



$$\underline{v_1 = 60^\circ}$$