

# TRIGONOMETRISET FUNKTIOT JA LUKUJONOT / 94

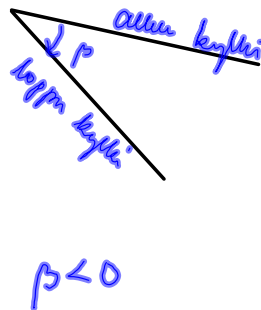
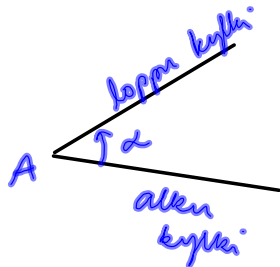
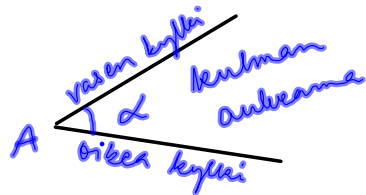
## TRIGONOMETRISET FUNKTIOT

Trigonometria

Historiaa

Reaaliluvun sini, kosini ja tangentti

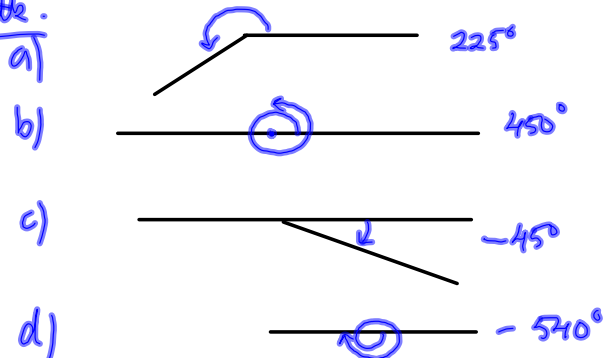
Summattu kulma



esim. Piirrä summattu kulma

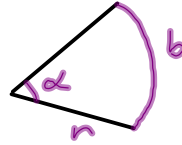
- a)  $225^\circ$       b)  $450^\circ$   
c)  $-45^\circ$       d)  $-540^\circ$

Ratke.



## Kulma reaalilukuna

$$\alpha = \frac{b}{r}$$



$$360^\circ = 2\pi \text{ (rad)}$$

$$1^\circ = \frac{\pi}{180} \text{ (rad)}$$

esim. Muunna radiaaneiksi

a)  $30^\circ$

b)  $135^\circ$

Ratk. a)  $1^\circ = \frac{\pi}{180}$ ,  $30^\circ = 30 \cdot \frac{\pi}{180} = \frac{\pi}{6}$

b) I tapa edellä

II tapa  $45^\circ$  on  $\frac{\pi}{4}$

$$135^\circ = 3 \cdot 45^\circ = 3 \cdot \frac{\pi}{4} = \frac{3\pi}{4}$$

esim. Muunna asteiksi

a) 1 rad

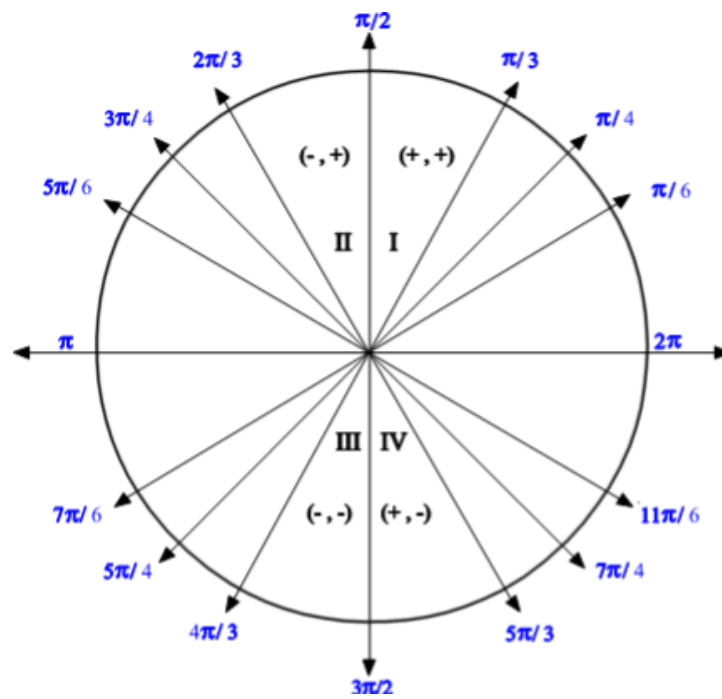
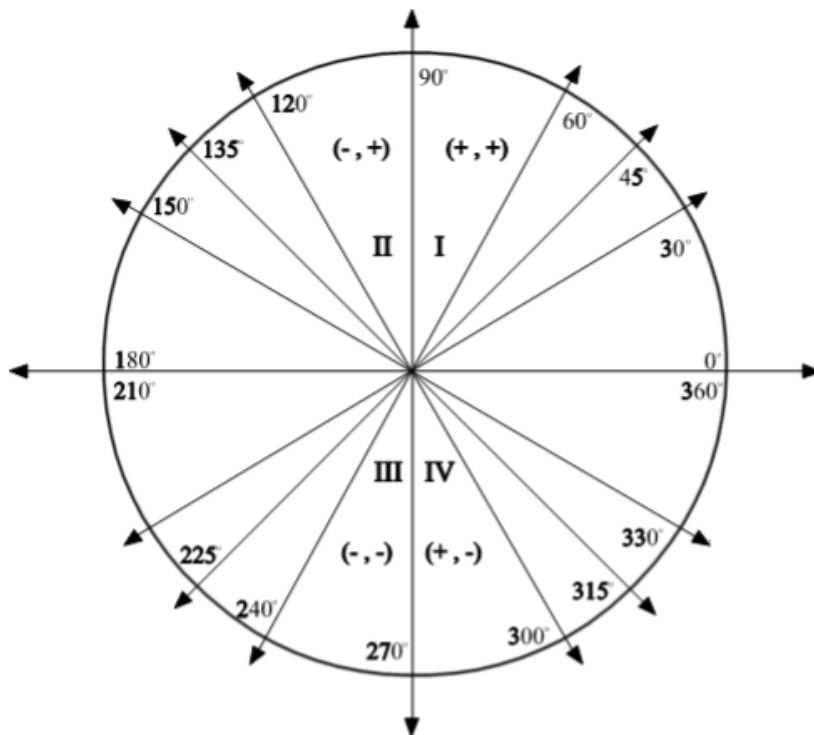
b)  $-\frac{11\pi}{6}$

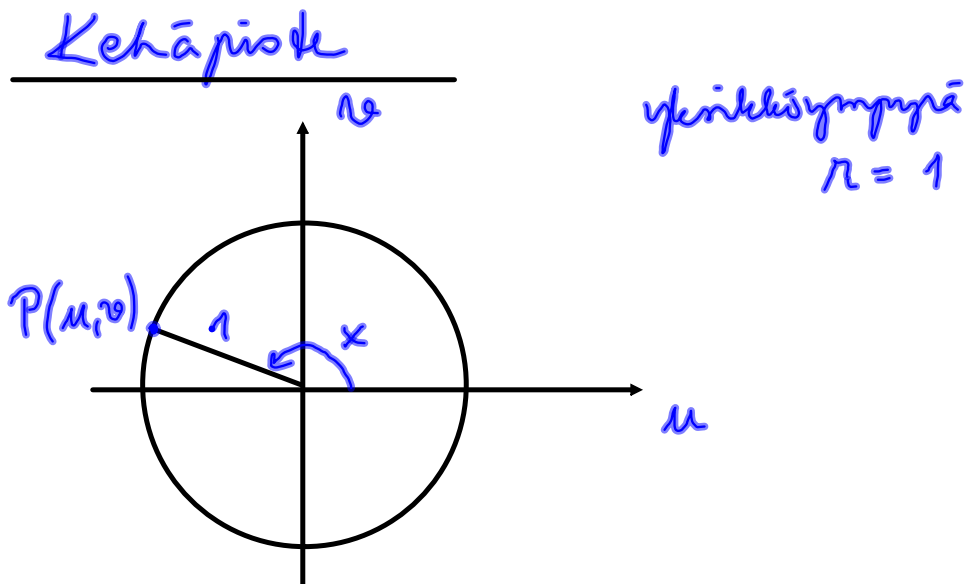
Ratk. a)  $1 \text{ rad} = \frac{360^\circ}{2\pi} = \frac{180^\circ}{\pi} \approx 57,30^\circ$

b)  $-\frac{11\pi}{6} = -\frac{11 \cdot 180^\circ}{6} = -330^\circ$

II tapa  $-\frac{11\pi}{6} = \frac{x}{180^\circ}$

$x = \text{kulma}$   
 $\text{asteina}$





esim Määritä kehäpiste, kun kulma on

a)  $60^\circ$

b)  $\frac{2\pi}{3}$

Ratk.

a)

$$u = \cos 60^\circ = \frac{1}{2}$$

$$v = \sin 60^\circ = \frac{\sqrt{3}}{2}$$

kehäpiste on  $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

b)  $x = \cos \frac{2\pi}{3} = -\frac{1}{2}$

$$y = \sin \frac{2\pi}{3} = \frac{\sqrt{3}}{2}$$

kp.  $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$

Sinin ja kormin tarkkoja  
aivoja

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MAOL /S.

muistikaavat

