

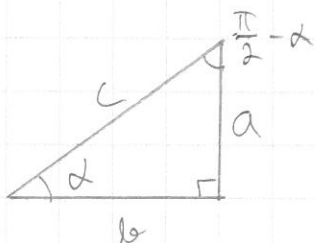
yhteenlaskukaavat (sinin hypoteusa, kosinin pohuus)

$$\sin(x+y) = \sin x \cdot \cos y + \cos x \cdot \sin y$$

(jee!)

$$\cos(x+y) = \cos x \cdot \cos y - \sin x \cdot \sin y$$

(huji!)

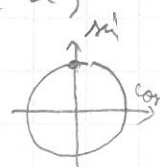


$$\frac{a}{c} = \sin \alpha = \cos\left(\frac{\pi}{2} - \alpha\right)$$

$$\frac{b}{c} = \cos \alpha = \sin\left(\frac{\pi}{2} - \alpha\right)$$

huom. Kaavat pätevät yleisesti:

$$\begin{aligned} \cos\left(\frac{\pi}{2} - \alpha\right) &= \cos\left(\frac{\pi}{2} + (-\alpha)\right) = \underbrace{\cos \frac{\pi}{2}}_{=0} \cdot \cos(-\alpha) - \underbrace{\sin \frac{\pi}{2}}_{=1} \cdot \sin(-\alpha) \\ &= -\sin(-\alpha) = -(-\sin \alpha) = \sin \alpha \end{aligned}$$



Siten kosini voidaan aina muuttaa siniksi ja sini kosiniksi kun muutetaan kulma $\alpha \rightarrow \frac{\pi}{2} - \alpha$ ($\alpha \rightarrow 90^\circ - \alpha$)

3.2, 6, 7, 18

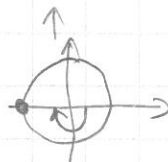
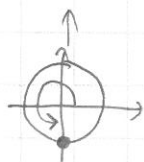
3.2 a) $\cos 1170^\circ = \cos(3 \cdot 360^\circ + 90^\circ) = \cos 90^\circ = 0$

$$\frac{1170^\circ}{360^\circ} = 3,25$$

b) $\sin(-540^\circ) = \sin(-540^\circ + 2 \cdot 360^\circ) = \sin 180^\circ = 0$



c) $\sin 990^\circ + \cos(-900^\circ) = \sin(2 \cdot 360^\circ + 270^\circ) + \cos(-2 \cdot 360^\circ - 180^\circ)$
 $= \sin 270^\circ + \cos(-180^\circ) = -1 + (-1) = -2$



3.6 a) $\frac{\cos 37^\circ}{\sin 53^\circ} = \frac{\sin(90^\circ - 37^\circ)}{\sin 53^\circ} = \frac{\sin 53^\circ}{\sin 53^\circ} = 1$

b) $\frac{2 \sin \frac{3\pi}{5}}{\cos \frac{\pi}{10}} = \frac{2 \cos\left(\frac{\pi}{2} - \frac{3\pi}{5}\right)}{\cos \frac{\pi}{10}} = \frac{2 \cos\left(\frac{5\pi}{10} - \frac{6\pi}{10}\right)}{\cos \frac{\pi}{10}} = \frac{2 \cos\left(-\frac{\pi}{10}\right)}{\cos \frac{\pi}{10}}$
 $= \frac{2 \cos \frac{\pi}{10}}{\cos \frac{\pi}{10}} = 2$