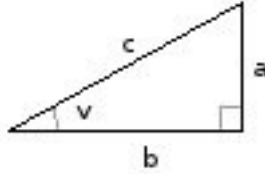# Trigonometri

Defenetioner

$$\sin(v) = \frac{a}{c}$$

$$\cos(v) = \frac{b}{c}$$

$$\tan(v) = \frac{a}{b}$$

Eulers formler

$$\sin(v) = \frac{e^{iv} - e^{-iv}}{2i}$$

$$\cos(v) = \frac{e^{iv} + e^{-iv}}{2}$$

$$e^{iv} = \cos(v) + i\mathrm{Sin}(v)$$

Triangelsatser

$$Areasatsen: \quad Arean = \frac{bc\sin(A)}{2}$$

$$Sinussatsen: \quad \frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c} \quad eller \quad \frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

$$Cosinussatsen: \quad a^2 = b^2 + c^2 - 2bc\cdot\cos(A)$$

Enkla samband

$$\sin(180^o - u) = \sin(u)$$

$$\cos(180^o - u) = -\cos(u)$$

$$\tan(180^o - u) = -\tan(u)$$

$$\sin(90^o - u) = \cos(u)$$

$$\cos(90^o - u) = \sin(u)$$

$$\tan(90^o - u) = \cot(u) = \frac{1}{\tan(u)}$$

$$\sin(-u) = -\sin(u)$$

$$\cos(-u) = \cos(u)$$

$$\tan(-u) = -\tan(u)$$

Additionssatserna

$$\sin(u+v) = \sin(u)\cdot\cos(v) + \cos(u)\cdot\sin(v)$$

$$\sin(u-v) = \sin(u)\cdot\cos(v) - \cos(u)\cdot\sin(v)$$

$$\cos(u+v) = \cos(u)\cdot\cos(v) - \sin(u)\cdot\sin(v)$$

$$\cos(u-v) = \cos(u)\cdot\cos(v) + \sin(u)\cdot\sin(v)$$

$$\tan(u+v) = \frac{\tan(u) + \tan(v)}{1 - \tan(u)\cdot\tan(v)}$$

$$\tan(u-v) = \frac{\tan(u) - \tan(v)}{1 + \tan(u)\cdot\tan(v)}$$

Trigonometriska ettan

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

Formler för dubblavinkeln

$$\sin(2u) = 2\sin(u)\cdot\cos(u)$$

$$\cos(2u) = \cos^2(u) - \sin^2(u) = 2\cos^2(u) - 1 = 1 - 2\sin^2(u)$$

$$\tan(2u) = \frac{2\tan(u)}{1 - \tan^2(u)}$$

Formler för halva vinkeln

$$\sin^2\left(\frac{u}{2}\right) = \frac{1 - \cos(u)}{2}$$

$$\cos^2\left(\frac{u}{2}\right) = \frac{1 + \cos(u)}{2}$$

Produktformlerna

$$2\cos(u)\cdot\cos(v) = \cos(u-v) + \cos(u+v)$$

$$2\sin(u)\cdot\sin(v) = \cos(u-v) - \cos(u+v)$$

$$2\sin(u)\cdot\cos(v) = \sin(u-v) + \sin(u+v)$$

Uttrycket a sinx + b cosx:

$$a\cdot\sin(x) + b\cdot\cos(x) = \sqrt{a^2+b^2}\cdot\sin(x+v)$$

$$a\cdot\sin(x) - b\cdot\cos(x) = \sqrt{a^2+b^2}\cdot\sin(x-v)$$

$$Då \ a>0, \ b>0, \ \tan(v)=\frac{b}{a}, \ 0<v<90^o$$