• <u>Härled vid behov</u>

$\cos^2 x + \sin^2 x = 1$

$\cos^2 x = 1 - \sin^2 x$

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

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

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

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

Utgå från

$$\cos 2x = 1 - 2\sin^2 x$$
$$\Updownarrow$$
$$2\sin^2 x = 1 - \cos 2x$$
$$\Updownarrow$$
$$\sin^2 x = \frac{1}{2}(1 - \cos 2x)$$

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$$\cos 2x = 2\cos^2 x - 1$$
$$\Updownarrow$$
$$2\cos^2 x = 1 + \cos 2x$$
$$\Updownarrow$$
$$\cos^2 x = \frac{1}{2}(1 + \cos 2x)$$

$$\begin{cases} \cos(x+y) = \cos x \cos y - \sin x \sin y & (1) \\ \cos(x-y) = \cos x \cos y + \sin x \sin y & (2) \end{cases}$$

$$(2)-(1): \quad \cos(x-y) - \cos(x+y) = 0 + 2 \cdot \sin x \cdot \sin y$$

$$\Updownarrow$$

$$\sin x \cdot \sin y = \frac{1}{2}\left(\cos(x-y) - \cos(x+y)\right)$$

$$\boxed{1 + \tan^2 x = \frac{1}{\cos^2 x}} \quad \left(= \frac{d}{dx} \tan x\right)$$

$$1 + \tan^2 x = 1 + \left(\frac{\sin x}{\cos x}\right)^2 = 1 + \frac{\sin^2 x}{\cos^2 x}$$

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