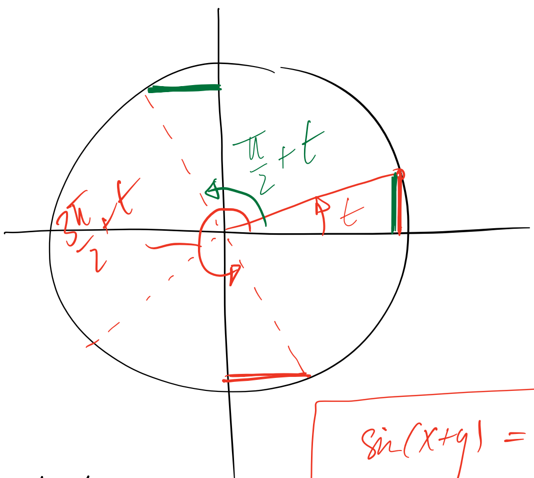
$$\sin(\boxed{3\alpha}) = \cos\left(\boxed{\frac{3\pi}{2}+3\alpha}\right) = \cos\Big(3\big(\underbrace{\tfrac{\pi}{2}+\alpha}_{\beta}\big)\Big)$$

$$\cos(3\alpha) = 4\cos^3(\alpha) - 3\cos(\alpha)$$

7 mars

$$= 4\cos^3\left(\frac{\pi}{2}+\alpha\right) - 3\cos\left(\frac{\pi}{2}+\alpha\right)$$



$$= 4(-\sin(\alpha))^3 - 3(-\sin(\alpha))$$

$$= -4\sin^3(\alpha) + 3\sin(\alpha)$$

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

$$\sin(2x) = \sin(x+x) = \sin x\cos x + \sin x\cos x = 2\sin x\cos x$$

Autre preuve:

$$\sin(3\alpha) = \sin(2\alpha+\alpha) = \sin 2\alpha\cos\alpha + \sin\alpha\cos 2\alpha$$

$$= 2\sin\alpha\cos\alpha\cos\alpha + \sin\alpha(1-2\sin^2\alpha)$$

$$= 2\sin\alpha(1-\sin^2\alpha) + \sin\alpha - 2\sin^3\alpha$$

$$= -4\sin^3\alpha + 3\sin\alpha$$

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

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

$$\boxed{\sin^2 t - 4\sin t \cos t + 3\cos^2 t = 0}$$

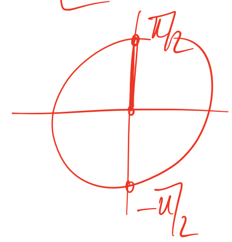
① $t = \frac{\pi}{2} + k\pi$: à tester.

② $t \neq \frac{\pi}{2} + k\pi$:

$\div \cos^2 t$

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

$$\boxed{t \neq \frac{\pi}{2} + k\pi}$$



$$\boxed{\frac{\sin^2 t}{\cos^2 t}} - \frac{4\sin t\,\cancel{\cos t}}{\cos t\,\cancel{\cos t}} + \frac{3\cos^2 t}{\cos^2 t} = 0$$

$\left(\frac{\sin t}{\cos t}\right)^2$

$$\boxed{\tan^2 t - 4\tan t + 3 = 0}$$

$y = \tan t$

$$y^2 - 4y + 3 = (y-1)(y-3) = 0$$

$\left.\begin{array}{l}\tan t = 1 \\ \tan t = 3\end{array}\right\}$ donnent les solutions (si $\neq \frac{\pi}{2} + k\pi$)