

### Exercice 3

①  $\cos(\pi/8) = ?$

$$\cos\left(\frac{\pi}{4}\right) = \cos\left(\frac{\pi}{8} + \frac{\pi}{8}\right) = \cos^2\left(\frac{\pi}{8}\right) - \sin^2\left(\frac{\pi}{8}\right) = 2\cos^2\left(\frac{\pi}{8}\right) - 1$$

$$\Leftrightarrow \cos^2\left(\frac{\pi}{8}\right) = \frac{\cos(\pi/4) + 1}{2} \quad \Rightarrow \quad \cos\frac{\pi}{8} = \sqrt{\frac{\cos(\pi/4) + 1}{2}}$$

$$\text{Donc } \cos\left(\frac{\pi}{8}\right) = \sqrt{\frac{1/\sqrt{2} + 1}{2}} = \sqrt{\frac{1 + \sqrt{2}}{2\sqrt{2}}} = \sqrt{\frac{\sqrt{2} + 2}{4}}$$
$$= \frac{\sqrt{\sqrt{2} + 2}}{2}$$

Donc c'est VRAI.

②  $\forall x \in ]0; \pi/2[$ ,  $\frac{\sin 3x}{\sin x} - \frac{\cos 3x}{\cos x} = \frac{\sin(3x)\cos x - \cos 3x \sin x}{\sin x \cos x}$

$$= \frac{\sin^2(2x)}{\frac{1}{2} \sin(2x)} = \frac{1}{1/2} = 2$$

Donc c'est VRAI