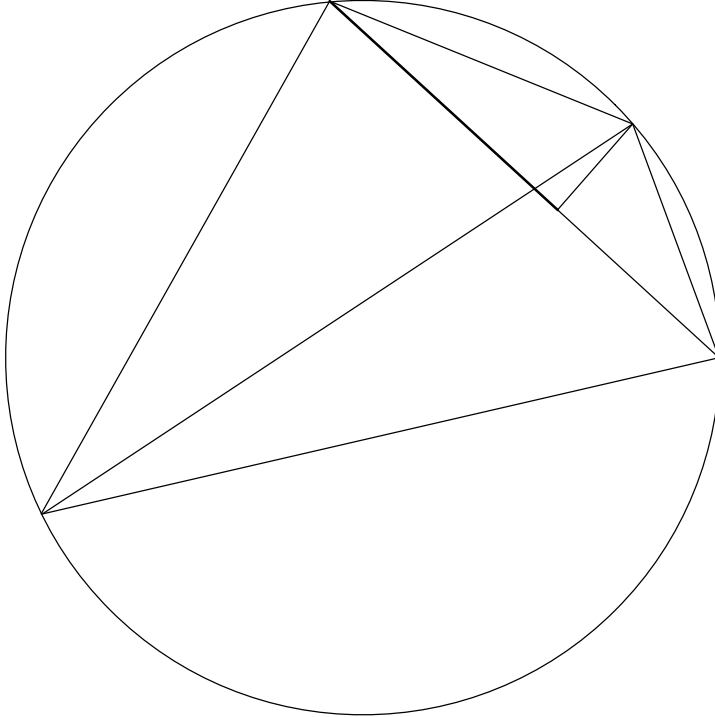


- (1) 1. Dans le cercle ci-dessous, de diamètre 1, indiquez clairement (utilisez des couleurs) les angles a et b et
- $\sin a$
 - $\sin b$
 - $\sin a \cdot \cos b$
 - $\sin b \cdot \cos a$
 - $\sin(a + b)$



- (1) 2. Justifier la formule $\cos(a + b) = \dots$
- (1) 3. Justifier la formule $\operatorname{tg}(a + b) = \dots$

- (2) 4. Calculer $\sin \frac{\pi}{12}$
 $\operatorname{tg} \frac{7\pi}{12}$

$$\sin \frac{5\pi}{12} = \sin\left(\frac{\pi}{4} - \frac{\pi}{6}\right) = \sin \frac{\pi}{4} \cos \frac{\pi}{6} - \sin \frac{\pi}{6} \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2} \frac{\sqrt{3}}{2} - \frac{1}{2} \frac{\sqrt{2}}{2} = \frac{\sqrt{6} - \sqrt{2}}{4}$$

$$\operatorname{tg} \frac{7\pi}{12} = \operatorname{tg}\left(\frac{\pi}{4} + \frac{\pi}{3}\right) = \frac{\operatorname{tg} \frac{\pi}{4} + \operatorname{tg} \frac{\pi}{3}}{1 - \operatorname{tg} \frac{\pi}{4} \operatorname{tg} \frac{\pi}{3}} = \frac{1 + \sqrt{3}}{1 - \sqrt{3}} = \frac{4 + 2\sqrt{3}}{-2} = -2 - \sqrt{3}$$

- (2) 5. Sachant que $\sin a = \frac{3}{5}$ et $\cos a < 0$, calculer
- $\cos a$
 - $\cos 2a$
 - $\operatorname{tg} 2a$
 - $\sin 3a$

$$\cos^2 a = 1 - \sin^2 a = 1 - \frac{9}{25} = \frac{16}{25}$$

$$\cos a = -\frac{4}{5}$$

$$\cos 2a = \cos^2 a - \sin^2 a = \frac{16}{25} - \frac{9}{25} = \frac{7}{25}$$

$$\sin 2a = 2 \sin a \cos a = -2 \frac{3}{5} \frac{4}{5} = -\frac{24}{25}$$

$$\operatorname{tg} 2a = \frac{\sin 2a}{\cos 2a} = \frac{-\frac{24}{25}}{\frac{7}{25}} = -\frac{24}{7}$$

$$\sin 3a = \sin 2a \cos a + \sin a \cos 2a = \frac{-24}{25} \left(\frac{-4}{5}\right) + \frac{3}{5} \frac{7}{25} = \frac{-117}{125}$$

(3) 6. Vérifiez l'égalité suivante: $\cos 2a (1 + \operatorname{tg} a \cdot \operatorname{tg} 2a) = 1$

$$\cos 2a \left(1 + \operatorname{tg} a \frac{\sin 2a}{\cos 2a}\right) =$$

$$\cos 2a + \operatorname{tg} a \sin 2a = \cos^2 a - \sin^2 a + \frac{\sin a}{\cos a} 2 \sin a \cos a = \cos^2 a - \sin^2 a + 2 \sin^2 a = \cos^2 a + \sin^2 a = 1$$

(1) 7. Compléter

a) dom tg =

b) Im cos =

c) Parité: sin est une fonction

d) $\lim_{x \rightarrow \frac{3\pi}{2}^+} \operatorname{tg}(x) =$

$$x \rightarrow \frac{3\pi}{2}^+$$

a) dom tg = $\mathbb{R} \setminus \left\{ \frac{\pi}{2} + k\pi \right\}$

b) Im cos = $[-1, 1]$

c) Parité: sin est une fonction **impaire**

d) $\lim_{x \rightarrow \frac{3\pi}{2}^+} \operatorname{tg}(x) = -\infty$

$$x \rightarrow \frac{3\pi}{2}^+$$