Trigonometric Formulas Sheet / Fiche de Formules Trigonométriques

Reference Table / Tableau de référence

Angle (radians)	Angle (degrees)	$\sin(x)$	$\cos(x)$	$\tan(x)$
0	0°	0	1	0
$\frac{\pi}{6}$	30°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{3}}{3}$
$\frac{\pi}{4}$	45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$	1
$\frac{\pi}{3}$	60°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\sqrt{3}$
$\frac{\pi}{2}$	90°	1	0	undefined

Arc Length & Sector Area / Longueur d'Arc & Aire d'un Secteur

Angle (radians)	Arc Length L	Sector Area A
θ	$r\theta$	$\frac{1}{2}r^2\theta$

Fundamental Identities / Identités Fondamentales

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

$$\tan(\alpha) = \frac{\sin(\alpha)}{\cos(\alpha)}$$

Angle Transformations / Transformations d'Angles

Transformation	$\sin(\alpha)$	$\cos(\alpha)$	$\tan(\alpha)$
Opposite Angle $(-\alpha)$	$-\sin(\alpha)$	$\cos(\alpha)$	$-\tan(\alpha)$
Supplementary Angle $(\pi - \alpha)$	$\sin(\alpha)$	$-\cos(\alpha)$	$-\tan(\alpha)$

Transformation	$\sin(\alpha)$	$\cos(\alpha)$	$\tan(\alpha)$
Anti-Supplementary Angle $(\pi + \alpha)$	$-\sin(\alpha)$	$-\cos(\alpha)$	$\tan(\alpha)$
Complementary Angle $(\frac{\pi}{2} - \alpha)$	$\cos(\alpha)$	$\sin(\alpha)$	$\frac{1}{\tan(\alpha)}$
Anti-Complementary Angle $(\frac{\pi}{2} + \alpha)$	$\cos(\alpha)$	$-\sin(\alpha)$	$-\frac{1}{\tan(\alpha)}$
Periodicity $(2\pi + \alpha)$	$\sin(\alpha)$	$\cos(\alpha)$	$\tan(\alpha)$

Practice Questions / Questions d'Application

1. Opposite Angles / Angles Opposés

Compute $\sin(-\frac{\pi}{3})$.

Solution:

Using the identity $\sin(-\alpha) = -\sin(\alpha)$:

$$\sin(-\frac{\pi}{3}) = -\sin(\frac{\pi}{3}) = -\frac{\sqrt{3}}{2}$$

4. Complementary Angles / Angles Complémentaires

Compute $\sin(\frac{\pi}{2} - \frac{\pi}{3})$.

Solution:

Using the identity $\sin(\frac{\pi}{2} - \alpha) = \cos(\alpha)$:

$$\sin(\frac{\pi}{2} - \frac{\pi}{3}) = \cos(\frac{\pi}{3}) = \frac{1}{2}$$

5. Periodicity / Périodicité

Compute $\cos(2\pi + \frac{\pi}{4})$.

Solution:

Using the identity $\cos(2\pi + \alpha) = \cos(\alpha)$:

$$\cos(2\pi + \frac{\pi}{4}) = \cos(\frac{\pi}{4}) = \frac{\sqrt{2}}{2}$$

6. Arc Length Calculation / Calcul de la Longueur d'Arc

A circle has a radius of **5cm**. Find the arc length corresponding to an angle of $\frac{\pi}{3}$.

Solution:

Using the arc length formula:

$$L = r\theta$$

$$L = 5 \times \frac{\pi}{3} = \frac{5\pi}{3} \approx 5.24 \text{ cm}$$

7. Sector Area Calculation / Calcul de l'Aire d'un Secteur

A sector has a radius of **4cm** and an angle of $\frac{\pi}{4}$. Find its area.

Solution:

Using the sector area formula:

$$A = \frac{1}{2}r^2\theta$$

$$A = \frac{1}{2} \times 4^2 \times \frac{\pi}{4}$$

$$A = \frac{16}{2} \times \frac{\pi}{4} = \frac{16\pi}{8} = 2\pi \approx 6.28 \text{ cm}^2$$