

# FORMULAIRE DE TRIGONOMETRIE

## RELATIONS GÉNÉRALES

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

$$\tan(x) = \frac{\sin(x)}{\cos(x)} \quad \cotan(x) = \frac{\cos(x)}{\sin(x)}$$

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

### VALEURS USUELLES

$x$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin(x)$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos(x)$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0
$\tan(x)$	0	$\frac{\sqrt{3}}{3}$	1	$\sqrt{3}$	non défini
$\cotan(x)$ non défini		$\sqrt{3}$	1	$\frac{\sqrt{3}}{3}$	0

### SYMÉTRIES

$$\sin(-x) = -\sin(x) \quad \cos(-x) = \cos(x)$$

$$\sin\left(\frac{\pi}{2} + x\right) = \cos(x) \quad \cos\left(\frac{\pi}{2} + x\right) = -\sin(x)$$

$$\sin\left(\frac{\pi}{2} - x\right) = \cos(x) \quad \cos\left(\frac{\pi}{2} - x\right) = \sin(x)$$

$$\sin(\pi + x) = -\sin(x) \quad \cos(\pi + x) = -\cos(x)$$

$$\sin(\pi - x) = \sin(x) \quad \cos(\pi - x) = -\cos(x)$$

## FORMULES D'ADDITION

$$\sin(a + b) = \sin(a)\cos(b) + \cos(a)\sin(b)$$

$$\cos(a + b) = \cos(a)\cos(b) - \sin(a)\sin(b)$$

$$\tan(a + b) = \frac{\tan(a) + \tan(b)}{1 - \tan(a)\tan(b)}$$

$$\sin(a - b) = \sin(a)\cos(b) - \cos(a)\sin(b)$$

$$\cos(a - b) = \cos(a)\cos(b) + \sin(a)\sin(b)$$

$$\tan(a - b) = \frac{\tan(a) - \tan(b)}{1 + \tan(a)\tan(b)}$$

## FORMULES DE DUPLICATION

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

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

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

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

$$\tan(2x) = \frac{2\tan(x)}{1 - \tan^2(x)}$$

Si on pose  $t = \tan\left(\frac{x}{2}\right)$

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

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

$$\tan(x) = \frac{2t}{1 - t^2}$$

## TRANSFORMATION DE PRODUIT EN SOMME

$$\cos(a)\cos(b) = \frac{1}{2}(\cos(a+b) + \cos(a-b))$$

$$\sin(a)\sin(b) = \frac{1}{2}(\cos(a-b) - \cos(a+b))$$

$$\sin(a)\cos(b) = \frac{1}{2}(\sin(a+b) + \sin(a-b))$$

## TRANSFORMATION DE SOMME EN PRODUIT

$$\sin(a) + \sin(b) = 2\sin\left(\frac{a+b}{2}\right)\cos\left(\frac{a-b}{2}\right)$$

$$\cos(a) + \cos(b) = 2\cos\left(\frac{a+b}{2}\right)\cos\left(\frac{a-b}{2}\right)$$

$$\sin(a) - \sin(b) = 2\sin\left(\frac{a-b}{2}\right)\cos\left(\frac{a+b}{2}\right)$$

$$\cos(a) - \cos(b) = -2\sin\left(\frac{a-b}{2}\right)\sin\left(\frac{a+b}{2}\right)$$