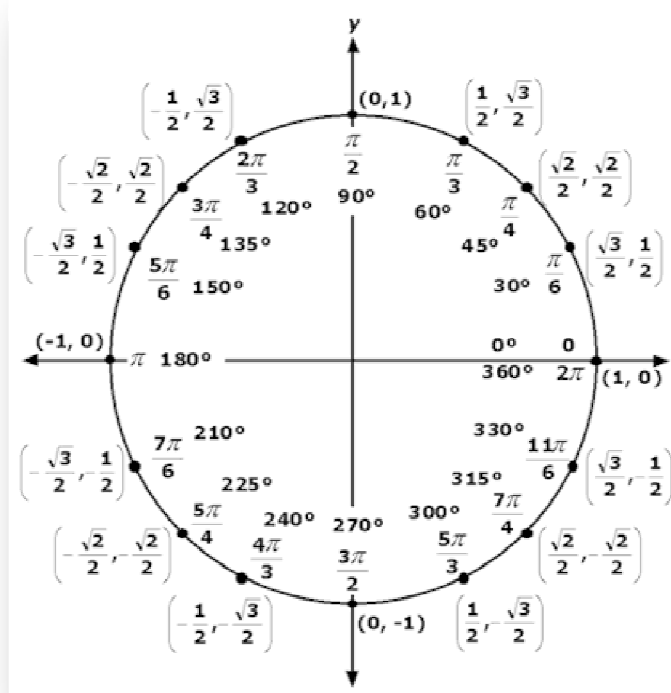


## الدائرة المثلثية

$\sin(\theta)$  و الترتيبية هي  $\cos(\theta)$  الفاصلة هي  
 $A(\cos(\theta), \sin(\theta))$



بعض العلاقات التي تخص الدالة  $\sin(x)$

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

$$= \frac{1}{2}(1 - \cos(2\alpha))$$

$$\sin(0) = 0$$

$$\sin(-\theta) = -\sin(\theta) \dots \dots \dots \text{(fonction impair دالة فردية)}$$

$$\sin(\alpha \pm \beta) = \sin(\alpha)\cos(\beta) \pm \sin(\beta)\cos(\alpha)$$

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

$$= \frac{2\tan(\alpha)}{1 + \tan^2(\alpha)}$$



$$\sin(\alpha)\cos(\beta) = \frac{1}{2}[\sin(\alpha + \beta) + \sin(\alpha - \beta)]$$

$$\cos(\alpha)\sin(\beta) = \frac{1}{2}[\sin(\alpha + \beta) - \sin(\alpha - \beta)]$$

$$\cos\left(\frac{\pi}{2} \pm \theta\right) = \mp \sin(\theta)$$

$$\sin\left(\frac{\pi}{2} \pm \theta\right) = \cos(\theta)$$

بعض العلاقات التي تخص الدالة  $\tan(x)$

$$\tan^2(\alpha) = \frac{\sin^2(\alpha)}{\cos^2(\alpha)}$$

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

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

$$= \frac{\sin^2(\alpha)}{1 - \sin^2(\alpha)}$$

$$\tan(0) = 0$$

$$\tan(-\theta) = -\tan(\theta) \dots \dots \dots \text{(fonction impair دالة فردية)}$$

$$\tan(\alpha \pm \beta) = \frac{\tan(\alpha) \pm \tan(\beta)}{1 \mp \tan(\alpha)\tan(\beta)}$$

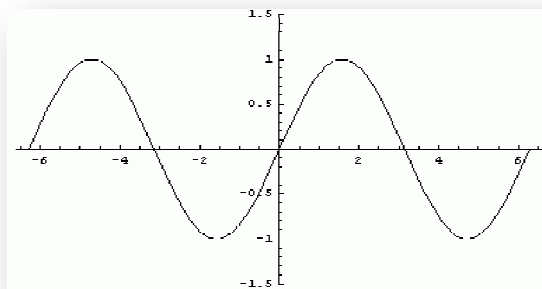
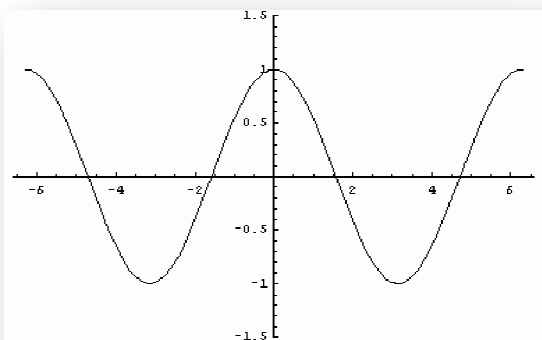
$$\tan(2\alpha) = \frac{2\tan(\alpha)}{1 - \tan^2(\alpha)}$$

$$\tan(\pi \mp \theta) = \frac{\sin(\pi \mp \theta)}{\cos(\pi \mp \theta)} = \frac{\pm \sin(\theta)}{-\cos(\theta)} = \mp \tan(\theta)$$

$$\tan\left(\frac{\pi}{2} \pm \theta\right) = \frac{\sin\left(\frac{\pi}{2} \pm \theta\right)}{\cos\left(\frac{\pi}{2} \pm \theta\right)} = \frac{\cos(\theta)}{\mp \sin(\theta)} = \mp \frac{1}{\tan(\theta)} = \mp \cot(\theta)$$

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

## رسم الدوال

 $\sin(x)$  $\cos(x)$  $\tan(x)$ 