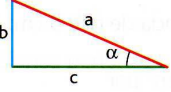
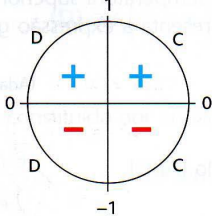
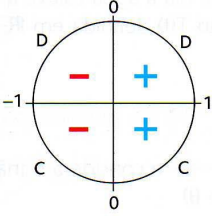
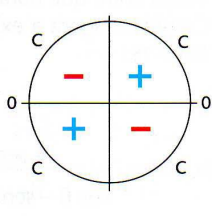
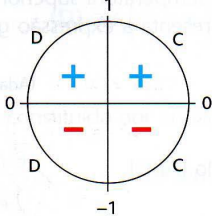
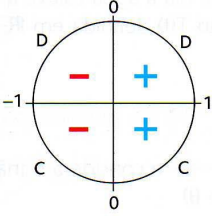
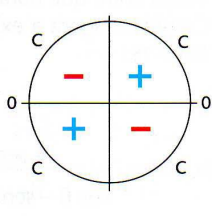
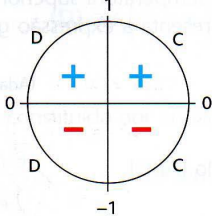
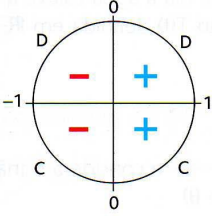
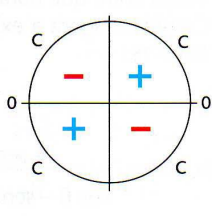
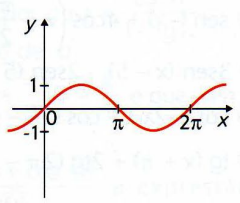
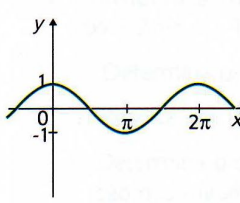
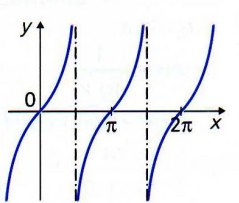




<p>Relações num triângulo rectângulo</p>	 $\frac{b}{a} = \text{sen } \alpha \quad \frac{c}{a} = \text{cos } \alpha \quad \frac{b}{c} = \text{tg } \alpha$						
<p>Fórmulas fundamentais</p>	$\text{sen}^2 \alpha + \text{cos}^2 \alpha = 1$ $\text{tg}^2 \alpha + 1 = \frac{1}{\text{cos}^2 \alpha}$ $\frac{\text{sen } \alpha}{\text{cos } \alpha} = \text{tg } \alpha$						
<p>Alguns valores exactos</p>	$\text{sen } \frac{\pi}{6} = \frac{1}{2} \quad \text{cos } \frac{\pi}{6} = \frac{\sqrt{3}}{2} \quad \text{tg } \frac{\pi}{6} = \frac{\sqrt{3}}{3}$ $\text{sen } \frac{\pi}{4} = \frac{\sqrt{2}}{2} \quad \text{cos } \frac{\pi}{4} = \frac{\sqrt{2}}{2} \quad \text{tg } \frac{\pi}{4} = 1$ $\text{sen } \frac{\pi}{3} = \frac{\sqrt{3}}{2} \quad \text{cos } \frac{\pi}{3} = \frac{1}{2} \quad \text{tg } \frac{\pi}{3} = \sqrt{3}$						
<p>Varição e sinal nos 4 quadrantes</p>	<table style="width: 100%; text-align: center;"> <thead> <tr> <th>seno</th> <th>co-seno</th> <th>tangente</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	seno	co-seno	tangente			
seno	co-seno	tangente					
							
<p>Relação entre as funções de α e as de $-\alpha$ e de $\pi \pm \alpha$</p>	$\text{sen } (-\alpha) = -\text{sen } \alpha \quad \text{sen } (\pi - \alpha) = \text{sen } \alpha \quad \text{sen } (\pi + \alpha) = -\text{sen } \alpha$ $\text{cos } (-\alpha) = \text{cos } \alpha \quad \text{cos } (\pi - \alpha) = -\text{cos } \alpha \quad \text{cos } (\pi + \alpha) = -\text{cos } \alpha$ $\text{tg } (-\alpha) = -\text{tg } \alpha \quad \text{tg } (\pi - \alpha) = -\text{tg } \alpha \quad \text{tg } (\pi + \alpha) = \text{tg } \alpha$						
<p>Relação entre as funções de ângulos complementares</p>	$\text{sen} \left(\frac{\pi}{2} - \alpha \right) = \text{cos } \alpha$ $\text{cos} \left(\frac{\pi}{2} - \alpha \right) = \text{sen } \alpha$ $\text{tg} \left(\frac{\pi}{2} - \alpha \right) = \frac{1}{\text{tg } \alpha}$						
<p>Equações trigonométricas</p>	<p>Reduzir à forma:</p> $\text{sen } x = \text{sen } \alpha \Leftrightarrow x = \alpha + k2\pi, k \in \mathbb{Z} \vee x = \pi - \alpha + k2\pi, k \in \mathbb{Z}$ $\text{cos } x = \text{cos } \alpha \Leftrightarrow x = \alpha + k2\pi, k \in \mathbb{Z} \vee x = -\alpha + k2\pi, k \in \mathbb{Z}$ $\text{tg } x = \text{tg } \alpha \Leftrightarrow x = -\alpha + k\pi, k \in \mathbb{Z}$						

	SENO	CO-SENO	TANGENTE
Funções	$x \curvearrowright \text{sen } x$	$x \curvearrowright \text{cos } x$	$x \curvearrowright \text{tg } x$
Domínio	\mathbb{R}	\mathbb{R}	$\left\{ x \in \mathbb{R} : x \neq \frac{\pi}{2} + k\pi, k \in \mathbb{Z} \right\}$
Contradomínio	$[-1, 1]$	$[-1, 1]$	\mathbb{R}
Zeros	$x = k\pi, k \in \mathbb{Z}$	$x = \frac{\pi}{2} + k\pi, k \in \mathbb{Z}$	$x = k\pi, k \in \mathbb{Z}$
Sinal	1.º Q e 2.º Q (+) 3.º Q e 4.º Q (-)	1.º Q e 4.º Q (+) 2.º Q e 3.º Q (-)	1.º Q e 3.º Q (+) 2.º Q e 4.º Q (-)
Varição	Crescente: 1.º Q e 4.º Q Decrescente: 2.º Q e 3.º Q	Crescente: 3.º Q e 4.º Q Decrescente: 1.º Q e 2.º Q	Crescente em todos os quadrantes
Periodicidade	Período: 2π	Período: 2π	Período: π
Paridade	Função ímpar	Função par	Função ímpar
Extremos	Máx. = $\text{sen}\left(\frac{\pi}{2} + k2\pi\right) = 1, k \in \mathbb{Z}$ Mín. = $\text{sen}\left(\frac{3\pi}{2} + k2\pi\right) = -1, k \in \mathbb{Z}$	Máx. = $\text{cos}(k2\pi) = 1, k \in \mathbb{Z}$ Mín. = $\text{cos}(\pi + k2\pi) = -1, k \in \mathbb{Z}$	Não tem máximo nem mínimo
Continuidade	Contínua em \mathbb{R}	Contínua em \mathbb{R}	Contínua no seu domínio
Derivadas	$(\text{sen } x)' = \text{cos } x$ $(\text{sen } u)' = u' \cdot \text{cos } u$	$(\text{cos } x)' = -\text{sen } x$ $(\text{cos } u)' = -u' \cdot \text{sen } u$	$(\text{tg } x)' = 1 + \text{tg}^2 x$ $(\text{tg } u)' = u' \cdot (1 + \text{tg}^2 u)$
Gráficos	 sinusóide	 co-sinusóide	 tangente
Fórmulas da soma, diferença, e da duplicação	$\text{sen}(a \pm b) = \text{sen } a \text{cos } b \pm \text{sen } b \text{cos } a;$ $\text{cos}(a \pm b) = \text{cos } a \text{cos } b \mp \text{sen } a \text{sen } b;$ $\text{tg}(a \pm b) = \frac{\text{tg } a \pm \text{tg } b}{1 \mp \text{tg } a \text{tg } b}$	$\text{sen}(2a) = 2\text{sen } a \text{cos } a$ $\text{cos}(2a) = \text{cos}^2 a - \text{sen}^2 a$ $\text{tg}(2a) = \frac{2 \text{tg } a}{1 - \text{tg}^2 a}$	
Limites	$\lim_{x \rightarrow 0} \frac{\text{sen } x}{x} = 1$	$\lim_{x \rightarrow 0} \frac{1 - \text{cos } x}{x} = 0$	$\lim_{x \rightarrow 0} \frac{\text{tg } x}{x} = 1$