
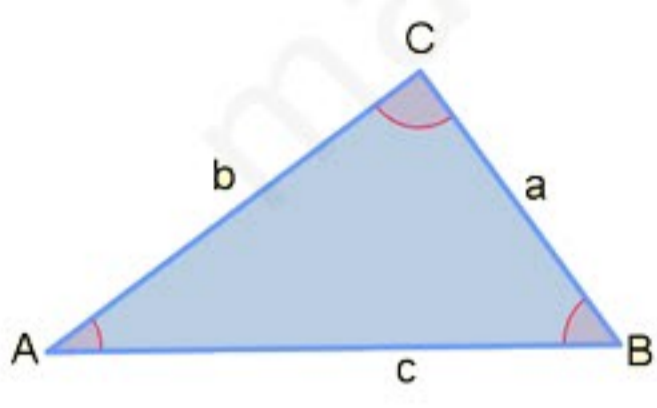


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| Razões Trigonômétricas |  | $\sin \alpha = \frac{\text{cat. op.}}{\text{hip.}}$ | <i>cat. op.</i> : cateto oposto <i>hip.</i> : hipotenusa |
| | | $\cos \alpha = \frac{\text{cat. adj.}}{\text{hip.}}$ | <i>cat. adj.</i> : cateto adjacente <i>hip.</i> : hipotenusa |
| | | $\tan \alpha = \frac{\text{cat. op.}}{\text{cat. adj.}}$ | <i>cat. op.</i> : cateto oposto <i>cat. adj.</i> : cateto adjacente |

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| Fórmulas Fundamentais | $\sin^2 \alpha + \cos^2 \alpha = 1$ | $\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$ | $\tan^2 \alpha + 1 = \frac{1}{\cos^2 \alpha}$ |
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|  | Lei dos Senos (ou Analogia dos Senos) | $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$ |
| | Lei dos Cossenos (ou Teorema de Carnot) | $a^2 = b^2 + c^2 - 2bc \cos A$ |
| | Fórmula de Herão | $A = \sqrt{s(s-a)(s-b)(s-c)}$ $s = \frac{a+b+c}{2}$ |

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| Valores Exatos | $\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$ | $\cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$ | $\tan\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{3}$ |
| | $\sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$ | $\cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$ | $\tan\left(\frac{\pi}{4}\right) = 1$ |
| | $\sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$ | $\cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$ | $\tan\left(\frac{\pi}{3}\right) = \sqrt{3}$ |

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| Relações entre Ângulos | $\sin(-\alpha) = -\sin \alpha$ | $\cos(-\alpha) = \cos \alpha$ | $\tan(-\alpha) = -\tan \alpha$ |
| | $\sin(\pi - \alpha) = \sin \alpha$ | $\cos(\pi - \alpha) = -\cos \alpha$ | $\tan(\pi - \alpha) = -\tan \alpha$ |
| | $\sin(\pi + \alpha) = -\sin \alpha$ | $\cos(\pi + \alpha) = -\cos \alpha$ | $\tan(\pi + \alpha) = \tan \alpha$ |
| | $\sin\left(\frac{\pi}{2} - \alpha\right) = \cos \alpha$ | $\cos\left(\frac{\pi}{2} - \alpha\right) = \sin \alpha$ | $\tan\left(\frac{\pi}{2} - \alpha\right) = \frac{1}{\tan \alpha}$ |
| | $\sin\left(\frac{\pi}{2} + \alpha\right) = \cos \alpha$ | $\cos\left(\frac{\pi}{2} + \alpha\right) = -\sin \alpha$ | $\tan\left(\frac{\pi}{2} + \alpha\right) = -\frac{1}{\tan \alpha}$ |
| | $\sin\left(\frac{3\pi}{2} - \alpha\right) = -\cos \alpha$ | $\cos\left(\frac{3\pi}{2} - \alpha\right) = -\sin \alpha$ | $\tan\left(\frac{3\pi}{2} - \alpha\right) = \frac{1}{\tan \alpha}$ |
| | $\sin\left(\frac{3\pi}{2} + \alpha\right) = -\cos \alpha$ | $\cos\left(\frac{3\pi}{2} + \alpha\right) = \sin \alpha$ | $\tan\left(\frac{3\pi}{2} + \alpha\right) = -\frac{1}{\tan \alpha}$ |
| | | $\sin x = \sin \alpha \Leftrightarrow x = \alpha + 2k\pi \vee x = \pi - \alpha + 2k\pi, k \in \mathbb{Z}$ | |

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| Equações Trigonômétricas | $\cos x = \cos \alpha \Leftrightarrow x = \alpha + 2k\pi \vee x = -\alpha + 2k\pi, k \in \mathbb{Z}$ |
| | $\tan x = \tan \alpha \Leftrightarrow x = \alpha + k\pi, k \in \mathbb{Z}$ |

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| Expressão da Soma | $\sin(a+b) = \sin a \times \cos b + \sin b \times \cos a$ |
| | $\cos(a+b) = \cos a \times \cos b - \sin a \times \sin b$ |
| | $\tan(a+b) = \frac{\tan a + \tan b}{1 - \tan a \times \tan b}$ |
| Expressão da Diferença | $\sin(a-b) = \sin a \times \cos b - \sin b \times \cos a$ |
| | $\cos(a-b) = \cos a \times \cos b + \sin a \times \sin b$ |
| | $\tan(a-b) = \frac{\tan a - \tan b}{1 + \tan a \times \tan b}$ |

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| Expressão da Duplicação | $\sin(2a) = 2 \times \sin a \times \cos a$ |
| | $\cos(2a) = \cos^2 a - \sin^2 a$ |
| | $\tan(2a) = \frac{2 \times \tan a}{1 - \tan^2 a}$ |