

MAT 211 - Cálculo III - IMEUSP
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TABELA TRIGONOMÉTRICA

1. $\cos(\alpha + \beta) = \cos\alpha\cos\beta - \operatorname{sen}\alpha\operatorname{sen}\beta$
2. $\operatorname{sen}(\alpha + \beta) = \operatorname{sen}\alpha\cos\beta + \operatorname{sen}\beta\cos\alpha$
3. $\operatorname{tg}(\alpha + \beta) = \frac{\operatorname{tg}\alpha + \operatorname{tg}\beta}{1 - \operatorname{tg}\alpha\operatorname{tg}\beta}$
4. $\sec^2 \theta = 1 + \operatorname{tg}^2 \theta$
5. $\operatorname{cosec}^2 \theta = 1 + \operatorname{cotg}^2 \theta$
6. $\cos 2\theta = \cos^2 \theta - \operatorname{sen}^2 \theta$
7. $\operatorname{sen} 2\theta = 2\operatorname{sen}\theta\cos\theta$
8. $\cos^2 \theta = \frac{1}{2} + \frac{1}{2}\cos 2\theta$
9. $\operatorname{sen}^2 \theta = \frac{1}{2} - \frac{1}{2}\cos 2\theta$
10. $\operatorname{sen}\theta = \frac{2\operatorname{tg}\frac{\theta}{2}}{1 + \operatorname{tg}^2\frac{\theta}{2}}, \text{ se } \cos\frac{\theta}{2} \neq 0$
11. $\cos\theta = \frac{1 - \operatorname{tg}^2\frac{\theta}{2}}{1 + \operatorname{tg}^2\frac{\theta}{2}}, \text{ se } \cos\frac{\theta}{2} \neq 0$
12. Fórmulas de prostaferese (transformam produto em adição ou subtração):
 - (a) $\operatorname{sen}\alpha\cos\beta = \frac{1}{2}[\operatorname{sen}(\alpha + \beta) + \operatorname{sen}(\alpha - \beta)]$
 - (b) $\cos\alpha\cos\beta = \frac{1}{2}[\cos(\alpha + \beta) + \cos(\alpha - \beta)]$
 - (c) $\operatorname{sen}\alpha\operatorname{sen}\beta = \frac{1}{2}[\cos(\alpha - \beta) - \cos(\alpha + \beta)]$
13. $\operatorname{sen}p - \operatorname{sen}q = 2\operatorname{sen}\left(\frac{p-q}{2}\right)\cos\left(\frac{p+q}{2}\right)$
14. $\operatorname{cosp} - \operatorname{cos}q = -2\operatorname{sen}\left(\frac{p+q}{2}\right)\operatorname{sen}\left(\frac{p-q}{2}\right)$
15. $\cos^2 \theta = \frac{1}{2}\left(1 + \frac{\operatorname{cotg} 2\theta}{\sqrt{1 + \operatorname{cotg}^2 2\theta}}\right).$

TABELA DE DERIVADAS

1. $f(x) = x^n \implies f'(x) = nx^{n-1}, \forall x \in \mathbb{R}, \forall n \in \mathbb{N}$
2. $f(x) = x^\alpha \implies f'(x) = \alpha x^{\alpha-1}, \forall x > 0, \forall \alpha \in \mathbb{R}$
3. $\sin' x = \cos x$
4. $\cos' x = -\text{sen } x$
5. $\tan' x = \sec^2 x$
6. $\sec' x = \sec x \text{tg } x$
7. $\cotg' x = -\text{cossec}^2 x$
8. $\text{cossec}' x = -\text{cossec } x \cot x$
9. $f(x) = e^x \implies f'(x) = e^x$
10. $\ln' x = \frac{1}{x}, \forall x > 0$
11. $\arctan' x = \frac{1}{1+x^2}$
12. $\arcsen' x = \frac{1}{\sqrt{1-x^2}}, x \in (-1, +1)$
13. $\sinh' x = \cosh x$
14. $\cosh' x = \sinh x$.

Regras de Derivação

1. $(f + g)' = f' + g'$
2. $(cf)' = cf'$, se c é uma constante
3. $(fg)' = f'g + fg'$
4. $\left(\frac{f}{g}\right)' = \frac{f'g - fg'}{g^2}$
5. $(f \circ g)'(p) = f'(g(p)) \cdot g'(p)$ (Regra da Cadeia).

Fórmulas Úteis de Derivação

1. $[e^{f(x)}]' = e^{f(x)} f'(x)$
2. $[\ln f(x)]' = \frac{f'(x)}{f(x)}$
3. $[f(x)^\alpha]' = \alpha f(x)^{\alpha-1} f'(x)$
5. $[a^x]' = a^x \ln a, a > 0$ e $a \neq 1$
4. $[f(x)^{g(x)}]' = f(x)^{g(x)} [g(x) \ln f(x)]'$.