TABELA: Derivadas, Integrais e Identidades Trigonométricas

• *Derivadas*

Sejam u e v funções deriváveis de x e n constante.

1. $y = u^n \Rightarrow y' = n\,u^{n-1}u'$.
2. $y = uv \Rightarrow y' = u'v + v'u$.
3. $y = \frac{u}{v} \Rightarrow y' = \frac{u'v - v'u}{v^2}$.
4. $y = a^u \Rightarrow y' = a^u(\ln a)\,u',\ (a > 0,\ a \neq 1)$.
5. $y = e^u \Rightarrow y' = e^u u'$.
6. $y = \log_a u \Rightarrow y' = \frac{u'}{u}\log_a e$.
7. $y = \ln u \Rightarrow y' = \frac{1}{u}u'$.
8. $y = u^v \Rightarrow y' = v\,u^{v-1}\,u' + u^v(\ln u)\,v'$.
9. $y = \text{sen}\ u \Rightarrow y' = u'\cos\ u$.
10. $y = \cos\ u \Rightarrow y' = -u'\text{sen}\ u$.
11. $y = \text{tg}\ u \Rightarrow y' = u'\sec^2 u$.
12. $y = \text{cotg}\ u \Rightarrow y' = -u'\text{cosec}^2 u$.
13. $y = \sec\ u \Rightarrow y' = u'\sec\ u\ \text{tg}\ u$.
14. $y = \text{cosec}\ u \Rightarrow y' = -u'\text{cosec}\ u\ \text{cotg}\ u$.
15. $y = arc\ \text{sen}\ u \Rightarrow y' = \frac{u'}{\sqrt{1-u^2}}$.
16. $y = arc\ \cos\ u \Rightarrow y' = \frac{-u'}{\sqrt{1-u^2}}$.
17. $y = arc\ \text{tg}\ u \Rightarrow y' = \frac{u'}{1+u^2}$.
18. $y = arc\ \text{cot}\,g\ u \Rightarrow \frac{-u'}{1+u^2}$.
19. $y = arc\ \sec\ u,\ |u| \geqslant 1$
$\Rightarrow y' = \frac{u'}{|u|\sqrt{u^2-1}},\ |u| > 1$.
20. $y = arc\ \text{cosec}\ u,\ |u| \geqslant 1$
$\Rightarrow y' = \frac{-u'}{|u|\sqrt{u^2-1}},\ |u| > 1$.

Funções Hiperbólicas

21. $y = \text{senh}\,u \Rightarrow y' = \cosh\ u \cdot u'$
22. $y = \cosh\ u \Rightarrow y' = \text{senh}\,u \cdot u'$
23. $y = \text{tgh}\,u \Rightarrow y' = \text{sech}^2\ u \cdot u'$
24. $y = \text{cotgh}\,u \Rightarrow y' = -\text{cosech}^2 u \cdot u'$
25. $y = \text{sech}\ u \Rightarrow y' = -\text{sech}\ u \cdot \text{tgh}\ u \cdot u'$
26. $y = \text{cosech}\,u \Rightarrow y' = -\text{cosech}\ u \cdot \text{cotgh}\,u \cdot u'$

• *Integrais*

1. $\int du = u + c$.
2. $\int u^n du = \frac{u^{n+1}}{n+1} + c,\ n \neq -1$.
3. $\int \frac{du}{u} = \ln|u| + c$.
4. $\int a^u du = \frac{a^u}{\ln a} + c,\ a > 0,\ a \neq 1$.
5. $\int e^u du = e^u + c$.
6. $\int \text{sen}\ u\ du = -\cos\ u + c$.
7. $\int \cos\ u\ du = \text{sen}\ u + c$.
8. $\int \text{tg}\ u\ du = \ln|\sec\ u| + c$.
9. $\int \text{cotg}\ u\ du = \ln|\text{sen}\ u| + c$.
10. $\int \sec\ u\ du = \ln|\sec\ u + \text{tg}\ u| + c$.
11. $\int \text{cosec}\ u\ du = \ln|\text{cosec}\ u - \text{cotg}\ u| + c$.
12. $\int \sec\ u\ \text{tg}\ u\ du = \sec\ u + c$.
13. $\int \text{cosec}\ u\ \text{cotg}\ u\ du = -\text{cosec}\ u + c$.
14. $\int \sec^2 u\ du = \text{tg}\ u + c$.
15. $\int \text{cosec}^2 u\ du = -\text{cotg}\ u + c$.
16. $\int \frac{du}{u^2+a^2} = \frac{1}{a}arc\ \text{tg}\frac{u}{a} + c$.
17. $\int \frac{du}{\sqrt{u^2+a^2}} = \ln\left|u + \sqrt{u^2+a^2}\right| + c$.
18. $\int \frac{du}{\sqrt{u^2-a^2}} = \ln\left|u + \sqrt{u^2-a^2}\right| + c$.
19. $\int \frac{du}{\sqrt{a^2-u^2}} = arc\ \text{sen}\frac{u}{a} + c,\ u^2 < a^2$.
20. $\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a}arc\ \sec\left|\frac{u}{a}\right| + c$.
21. $\int \frac{du}{u\sqrt{a^2-u^2}} = -\frac{1}{a}\ln\left|\frac{a + \sqrt{a^2-u^2}}{u}\right| + C$

22. $\int \text{senh}\ u\ du = \cosh\ u + C$
23. $\int \cosh\ u\ du = \text{senh}\ u + C$
24. $\int \text{sech}^2 u\ du = \text{tgh}\ u + C$
25. $\int \text{cosech}^2 u\ du = -\text{cotgh}\ u + C$
26. $\int \text{sech}\ u\ \text{tgh}\ u\ du = -\text{sech}\ u + C$
27. $\int \text{cosech}\ u\ \text{cotgh}\ u\ du = -\text{cosech}\ u + C$

• *Identidades Trigonométricas*

1. $\text{sen}^2 x + \cos^2 x = 1$.
2. $1 + \text{tg}^2 x = \sec^2 x$.
3. $1 + \text{cotg}^2 x = \text{cosec}^2 x$.
4. $\text{sen}^2 x = \frac{1-\cos\ 2x}{2}$.
5. $\cos^2 x = \frac{1+\cos\ 2x}{2}$.
6. $\text{sen}\ 2x = 2\ \text{sen}\ x\ \cos\ x$.
7. $2\ \text{sen}\ x\ \cos\ y = \text{sen}\,(x-y) + sen\,(x+y)$.
8. $2\ \text{sen}\ x\ \text{sen}\ y = \cos(x-y) - \cos(x+y)$.
9. $2\ \cos\ x\ \cos\ y = \cos(x-y) + \cos(x+y)$.
10. $1 \pm \text{sen}\ x = 1 \pm \cos\left(\frac{\pi}{2} - x\right)$.

• *Fórmulas de Recorrência*

1. $\int sen^n au\ du = -\frac{sen^{n-1} au\ \cos\ au}{an} + \left(\frac{n-1}{n}\right) \int sen^{n-2} au\ du.$

2. $\int \cos^n au\ du = \frac{sen\ au\ \cos^{n-1} au}{an} + \left(\frac{n-1}{n}\right) \int \cos^{n-2} au\ du.$

3. $\int tg^n au\ du = \frac{tg^{n-1} au}{a(n-1)} - \int tg^{n-2} au\ du.$

4. $\int cotg^n au\ du = -\frac{cotg^{n-1} au}{a(n-1)} - \int cotg^{n-2} au\ du.$

5. $\int \sec^n au\ du = \frac{\sec^{n-2} au\ tg\ au}{a(n-1)} + \left(\frac{n-2}{n-1}\right) \int \sec^{n-2} au\ du.$

6. $\int cosec^n au\ du = -\frac{cosec^{n-2} au\ cotg\ au}{a(n-1)} + \left(\frac{n-2}{n-1}\right) \int cosec^{n-2} au\ du.$