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. $y = \operatorname{sen} u \Rightarrow y' = u' \cos u$.
10. $y = \cos u \Rightarrow y' = -u' \operatorname{sen} u$.
11. $y = \operatorname{tg} u \Rightarrow y' = u' \sec^2 u$.
12. $y = \operatorname{cotg} u \Rightarrow y' = -u' \operatorname{cosec}^2 u$.
13. $y = \sec u \Rightarrow y' = u' \sec u \operatorname{tg} u$.
14. $y = \operatorname{cosec} u \Rightarrow y' = -u' \operatorname{cosec} u \operatorname{cotg} u$.
15. $y = arc\,\operatorname{sen} u \Rightarrow y' = \frac{u'}{\sqrt{1-u^2}}$.
16. $y = arc\,\cos u \Rightarrow y' = \frac{-u'}{\sqrt{1-u^2}}$.
17. $y = arc\,\operatorname{tg} u \Rightarrow y' = \frac{u'}{1+u^2}$.
18. $y = arc\,\cot g\,u \Rightarrow \frac{-u'}{1+u^2}$.
19. $y = arc\,\sec u,\ |u| \geqslant 1$
$\Rightarrow y' = \frac{u'}{|u|\sqrt{u^2-1}}, |u| > 1$.
20. $y = arc\,\operatorname{cosec} u,\ |u| \geqslant 1$
$\Rightarrow y' = \frac{-u'}{|u|\sqrt{u^2-1}}, |u| > 1$.

• *Identidades Trigonométricas*

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

• *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. $\int \operatorname{sen} u\,du = -\cos u + c$.
7. $\int \cos u\,du = \operatorname{sen} u + c$.
8. $\int \operatorname{tg} u\,du = \ln|\sec u| + c$.
9. $\int \operatorname{cotg} u\,du = \ln|\operatorname{sen} u| + c$.
10. $\int \sec u\,du = \ln|\sec u + \operatorname{tg} u| + c$.
11. $\int \operatorname{cosec} u\,du = \ln|\operatorname{cosec} u - \operatorname{cotg} u| + c$.
12. $\int \sec u \operatorname{tg} u\,du = \sec u + c$.
13. $\int \operatorname{cosec} u \operatorname{cotg} u\,du = -\operatorname{cosec} u + c$.
14. $\int \sec^2 u\,du = \operatorname{tg} u + c$.
15. $\int \operatorname{cosec}^2 u\,du = -\operatorname{cotg} u + c$.
16. $\int \frac{du}{u^2+a^2} = \frac{1}{a} arc\,\operatorname{tg}\frac{u}{a} + c$.
17. $\int \frac{du}{u^2-a^2} = \frac{1}{2a}\ln\left|\frac{u-a}{u+a}\right| + c,\ u^2 > a^2$.
18. $\int \frac{du}{\sqrt{u^2+a^2}} = \ln\left|u + \sqrt{u^2+a^2}\right| + c$.
19. $\int \frac{du}{\sqrt{u^2-a^2}} = \ln\left|u + \sqrt{u^2-a^2}\right| + c$.
20. $\int \frac{du}{\sqrt{a^2-u^2}} = arc\,\operatorname{sen}\frac{u}{a} + c,\ u^2 < a^2$.
21. $\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a} arc\,\sec\left|\frac{u}{a}\right| + c$.

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