

TABELA: Derivadas, Integrais e Identidades Trigonômétricas

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

• Identidades Trigonômétricas

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

• 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. $\int \sen u du = -\cos u + c$.
7. $\int \cos u du = \sen u + c$.
8. $\int \tg u du = \ln |\sec u| + c$.
9. $\int \cotg u du = \ln |\sen u| + c$.
10. $\int \sec u du = \ln |\sec u + \tg u| + c$.
11. $\int \operatorname{cosec} u du = \ln |\operatorname{cosec} u - \cotg u| + c$.
12. $\int \sec u \tg u du = \sec u + c$.
13. $\int \operatorname{cosec} u \cotg u du = -\operatorname{cosec} u + c$.
14. $\int \sec^2 u du = \tg u + c$.
15. $\int \operatorname{cosec}^2 u du = -\cotg u + c$.
16. $\int \frac{du}{u^2+a^2} = \frac{1}{a} \arc \tg \frac{u}{a} + c$.
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. $\int \frac{du}{\sqrt{a^2-u^2}} = \arc \sen \frac{u}{a} + c$, $u^2 < a^2$.
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. $\int \operatorname{cosec}^n au du = -\frac{\operatorname{cosec}^{n-2} au \cotg au}{a(n-1)} + \left(\frac{n-2}{n-1}\right) \int \operatorname{cosec}^{n-2} au du$.