

# 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.  $y = \sen u \Rightarrow y' = u' \cos u$ .
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 Trigonométricas

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