Instituto Tecnológico de Chihuahua II
Departamento de Ciencias Básicas
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Formulario de Cálculo Diferencial e Integral

Derivadas

1. $\frac{d}{dx}(c) = 0$
2. $\frac{d}{dx}(x) = 1$
3. $\frac{d}{dx}(cu) = c\ \frac{du}{dx}$
4. $\frac{d}{dx}(u+v) = \frac{du}{dx} + \frac{dv}{dx}$
5. $\frac{d}{dx}(x^n) = n\ x^{n-1}$
6. $\frac{d}{dx}(u^n) = n\ u^{n-1}\ \frac{du}{dx}$
7. $\frac{d}{dx}(u \cdot v) = u\ \frac{dv}{dx} + v\ \frac{du}{dx}$
8. $\frac{d}{dx}\left(\frac{u}{v}\right) = \frac{v\ \frac{du}{dx} - u\ \frac{dv}{dx}}{v^2}$
9. $\frac{d}{dx}(\text{sen}\ u) = \cos u\ \frac{du}{dx}$
10. $\frac{d}{dx}(\cos\ u) = -\text{sen}u\ \frac{du}{dx}$
11. $\frac{d}{dx}(\tan\ u) = \sec^2 u\ \frac{du}{dx}$
12. $\frac{d}{dx}(\cot\ u) = -\csc^2 u \frac{du}{dx}$
13. $\frac{d}{dx}(\sec\ u) = \sec u\ \tan u\ \frac{du}{dx}$
14. $\frac{d}{dx}(\csc\ u) = -\csc u\ \cot u\ \frac{du}{dx}$
15. $\frac{d}{dx}(\text{arcsen}\ u) = \frac{1}{\sqrt{1-u^2}}\ \frac{du}{dx}$
16. $\frac{d}{dx}(\arccos\ u) = -\frac{1}{\sqrt{1-u^2}}\ \frac{du}{dx}$
17. $\frac{d}{dx}(\arctan\ u) = \frac{1}{1+u^2}\ \frac{du}{dx}$
18. $\frac{d}{dx}(\text{arccot}\ u) = -\frac{1}{1+u^2}\ \frac{du}{dx}$
19. $\frac{d}{dx}(\text{arcsec}\ u) = \frac{1}{u\sqrt{u^2-1}}\ \frac{du}{dx}$
20. $\frac{d}{dx}(\text{arccsc}\ u) = -\frac{1}{u\sqrt{u^2-1}}\ \frac{du}{dx}$
21. $\frac{d}{dx}(\log_a\ u) = \frac{1}{u}\log_a\ e\ \frac{du}{dx}$
22. $\frac{d}{dx}(\ln\ u) = \frac{1}{u}\ \frac{du}{dx}$
23. $\frac{d}{dx}(a^u) = a^u\ ln\ a\ \frac{du}{dx}$
24. $\frac{d}{dx}(e^u) = e^u\ \frac{du}{dx}$
25. $\frac{d}{dx}(u^v) = v\ u^{v-1}\frac{du}{dx} + u^v \ln\ u\ \frac{dv}{dx}$

Regla de la cadena

$$\frac{df}{du} \cdot \frac{du}{dx} = \frac{df}{dx}$$

Integrales

1. $\int (du + dv) = \int du + \int dv + c$
2. $\int a\ du = a \int du + c$
3. $\int dx = x + c$
4. $\int u^n\ du = \frac{u^{n+1}}{n+1} + c,\ n \neq -1$
5. $\int \frac{du}{u} = ln\ |u| + c$
6. $\int a^u\ du = \frac{a^u}{ln\ a} + c$
7. $\int e^u\ du = e^u + c$
8. $\int \text{sen}\ u\ du = -\cos\ u + c$
9. $\int \cos\ u\ du = sen\ u + c$
10. $\int \sec^2\ u\ du = tan\ u + c$
11. $\int \csc^2\ u\ du = -\cot\ u + c$
12. $\int \sec\ u\ \tan\ u\ du = \sec\ u + c$
13. $\int \csc\ u\ \cot\ u\ du = -\csc\ u + c$
14. $\int \tan\ u\ du = -ln\ \cos\ u + c$
15. $\int \cot\ u\ du = \ln\ \text{sen}\ u + c$
16. $\int \sec\ u\ du = \ln|\sec\ u + \tan\ u| + c$
17. $\int \csc\ u\ du = \ln|\csc\ u - \cot\ u| + c$
18. $\int \frac{du}{u^2+a^2} = \frac{1}{a}\arctan\ \frac{u}{a} + c$
19. $\int \frac{du}{u^2-a^2} = \frac{1}{2a}\ln\left|\frac{u-a}{u+a}\right| + c,\ u^2 > a^2$
20. $\int \frac{du}{a^2-u^2} = \frac{1}{2a}\ln\left|\frac{a+u}{a-u}\right| + c,\ u^2 > a^2$
21. $\int \frac{du}{\sqrt{a^2-u^2}} = arcsen\frac{u}{a} + c$
22. $\int \frac{du}{\sqrt{u^2 \pm a^2}} = \ln|u + \sqrt{u^2 \pm a^2}| + c$
23. $\int \sqrt{a^2-u^2}\ du = \frac{u}{2}\sqrt{a^2-u^2} + \frac{a^2}{2} arcsen\ \frac{u}{a} + c$
24. $\int \sqrt{u^2 \pm a^2}\ du = \frac{u}{2}\sqrt{u^2 \pm a^2} \pm \frac{a^2}{2}\ln|u + \sqrt{u^2 \pm a^2}| + c$
25. $\int \frac{du}{u\sqrt{u^2-a^2}} = \frac{1}{a} arcsec\frac{u}{a} + c$

Integración por partes

26. $\int udv = uv - \int vdu$

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Propiedades de los logaritmos

Si A y B son números reales positivos

- $\log A + \log B = \log(AB)$
- $\log A - \log B = \log(\frac{A}{B})$
- $r \cdot \log B = \log B^r$

Identidades Trigonométricas

1. $\csc A = \dfrac{1}{\operatorname{sen} A}$
2. $\sec A = \dfrac{1}{\cos A}$
3. $\cot A = \dfrac{1}{\tan A}$
4. $\tan A = \dfrac{\operatorname{sen} A}{\cos A}$
5. $\cot A = \dfrac{\cos A}{\operatorname{sen} A}$
6. $\operatorname{sen}^2 A + \cos^2 A = 1$
7. $\tan^2 A + 1 = \sec^2 A$
8. $1 + \cot^2 A = \csc^2 A$
9. $\operatorname{sen}^2 A = \dfrac{1}{2} - \dfrac{1}{2}\cos 2A$
10. $\cos^2 A = \dfrac{1}{2} + \dfrac{1}{2}\cos 2A$
11. $\operatorname{sen} 2A = 2 \operatorname{sen} A \cos A$
12. $\cos 2A = \cos^2 A - \operatorname{sen}^2 A$

Ángulos Compuestos

13. $2\operatorname{sen}A \operatorname{sen}B = \cos(A-B) - \cos(A+B)$
14. $2\operatorname{sen}A \cos B = \operatorname{sen}(A+B) + \operatorname{sen}(A-B)$
15. $2\cos A \operatorname{sen}B = \operatorname{sen}(A+B) - \operatorname{sen}(A-B)$
16. $2\cos A \cos B = \cos(A+B) + \cos(A-B)$
17. $\operatorname{sen}(A+B) = \operatorname{sen} A \cos B + \cos A \operatorname{sen} B$
18. $\operatorname{sen}(A-B) = \operatorname{sen} A \cos B - \cos A \operatorname{sen} B$
19. $\cos(A+B) = \cos A \cos B - \operatorname{sen} A \operatorname{sen} B$
20. $\cos(A-B) = \cos A \cos B + \operatorname{sen} A \operatorname{sen} B$
21. $\tan(2A) = \dfrac{2\tan A}{1 - \tan^2 A}$
22. $\tan\dfrac{A}{2} = \dfrac{1-\cos A}{\operatorname{sen} A}$

Sumatorias y sus propiedades

1. $\sum_{i=1}^{n} a_i = a_1 + a_2 + a_3 + ... + a_n$
2. $\sum_{i=1}^{n}(a_i + b_i) = \sum_{i=1}^{n} a_i + \sum_{i=1}^{n} b_i$
3. $\sum_{i=1}^{n} c \cdot a_i = c\sum_{i=1}^{n} a_i$
4. $\sum_{i=1}^{n} a = a \cdot n$
5. $\sum_{i=1}^{n} i = \dfrac{n(n+1)}{2}$
6. $\sum_{i=1}^{n} i^2 = \dfrac{n(n+1)(2n+1)}{6}$
7. $\sum_{i=1}^{n} i^3 = \left(\dfrac{n(n+1)}{2}\right)^2$

Círculo Trigonométrico