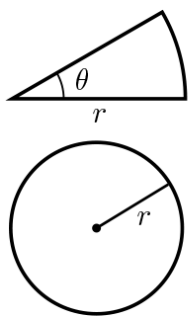
Hoja de fórmulas

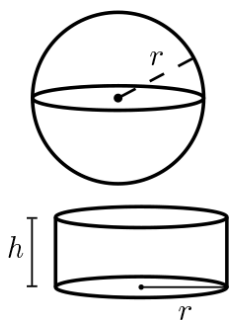
1· Geometría

Fórmulas para sectores circulares, círculos, esferas, cilindros y conos circulares rectos.



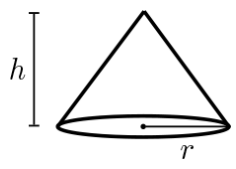
$A = \frac{1}{2}r^2\theta$
$s = \theta r$

$A = \pi r^2$
$C = 2\pi r$



$A = 4\pi r^2$
$V = \frac{4}{3}\pi r^3$

$V = \pi r^2 h$



$V = \frac{1}{3}\pi r^2 h$

2· Trigonometría

2.1· Identidades básicas

1. $\sin^2\alpha + \cos^2\alpha = 1$
2. $\tan^2\alpha + 1 = \sec^2\alpha$
3. $\cot^2\alpha + 1 = \csc^2\alpha$
4. $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \sin\beta\cos\alpha$
5. $\cos(\alpha \pm \beta) = \cos\alpha\cos\beta \mp \sin\alpha\sin\beta$
6. $\tan(\alpha \pm \beta) = \dfrac{\tan\alpha \pm \tan\beta}{1 \mp \tan\alpha\tan\beta}$
7. $\sin 2\alpha = 2\sin\alpha\cos\alpha$
8. $\cos 2\alpha = \cos^2\alpha - \sin^2\alpha$
9. $\cos 2\alpha = 2\cos^2\alpha - 1 = 1 - 2\sin^2\alpha$
10. $\sin^2\alpha = \dfrac{1-\cos(2\alpha)}{2}$
11. $\cos^2\alpha = \dfrac{1+\cos(2\alpha)}{2}$

2.2· Hechos útiles

Para los siguientes hechos, considerar el triángulo con lados de longitud *a*, *b*, *c*, y ángulos opuestos *A*, *B* y *C* respectivamente.

1. $\dfrac{\sin A}{a} = \dfrac{\sin B}{b} = \dfrac{\sin C}{c}$
2. $c^2 = a^2 + b^2 - 2ab\cos C$

3· Derivadas

3.1· Reglas básicas de derivación

1. $(k)' = 0$
2. $(x^n)' = nx^{n-1}$
3. $(kf(x))' = kf'(x)$
4. $(f(x) \pm g(x))' = f'(x) \pm g'(x)$
5. $(f(x)g(x))' = f'(x)g(x) + f(x)g'(x)$
6. $\left(\dfrac{f(x)}{g(x)}\right)' = \dfrac{f'(x)g(x) - f(x)g'(x)}{(g(x))^2}$

3.2· La regla de la cadena

$(f(g(x)))' = f'(g(x))g'(x)$

3.3· Funciones trigonométricas

1. $\dfrac{d}{dx}\sin x = \cos x$
2. $\dfrac{d}{dx}\cos x = -\sin x$
3. $\dfrac{d}{dx}\tan x = \sec^2 x$
4. $\dfrac{d}{dx}\csc x = -\csc x\cot x$
5. $\dfrac{d}{dx}\sec x = \sec x\tan x$
6. $\dfrac{d}{dx}\cot x = -\csc^2 x$
7. $\dfrac{d}{dx}\sin^{-1}x = \dfrac{1}{\sqrt{1-x^2}}$
8. $\dfrac{d}{dx}\cos^{-1}x = -\dfrac{1}{\sqrt{1-x^2}}$
9. $\dfrac{d}{dx}\tan^{-1}x = \dfrac{1}{1+x^2}$
10. $\dfrac{d}{dx}\csc^{-1}x = -\dfrac{1}{|x|\sqrt{x^2-1}}$
11. $\dfrac{d}{dx}\sec^{-1}x = \dfrac{1}{|x|\sqrt{x^2-1}}$
12. $\dfrac{d}{dx}\cot^{-1}x = -\dfrac{1}{1+x^2}$

3.4· Exponenciales y Logaritmo

1. $\dfrac{d}{dx}\ln x = \dfrac{1}{x}$
2. $\dfrac{d}{dx}e^x = e^x$
3. $\dfrac{d}{dx}a^x = a^x\ln a$
4. $\dfrac{d}{dx}f(x)^{g(x)} = \dfrac{d}{dx}e^{g(x)\ln(f(x))}$

4· Integrales

1. $\int u\,dv = uv - \int v\,du$
2. $\int u^n\,du = \dfrac{1}{n+1}u^{n+1} + C \quad (n \neq -1)$
3. $\int \dfrac{1}{u}\,du = \ln|u| + C$
4. $\int e^u du = e^u + C$
5. $\int a^u du = \dfrac{a^u}{\ln a} + C$
6. $\int \sin u\,du = -\cos u + C$
7. $\int \cos u\,du = \sin u + C$
8. $\int \sec^2 u\,du = \tan u + C$
9. $\int \csc^2 u\,du = -\cot u + C$
10. $\int \sec u\tan u\,du = \sec u + C$
11. $\int \csc u\cot u\,du = -\csc u + C$
12. $\int \tan u\,du = -\ln|\cos u| + C$
13. $\int \cot u\,du = \ln|\sin u| + C$
14. $\int \sec u\,du = \ln|\sec u + \tan u| + C$
15. $\int \csc u\,du = \ln|\csc u - \cot u| + C$
16. $\int \dfrac{1}{\sqrt{a^2-u^2}}\,du = \sin^{-1}\left(\dfrac{u}{a}\right) + C$
17. $\int \dfrac{1}{a^2+u^2}\,du = \dfrac{1}{a}\tan^{-1}\left(\dfrac{u}{a}\right) + C$
18. $\int \dfrac{1}{u\sqrt{u^2-a^2}}\,du = \dfrac{1}{a}\sec^{-1}\left|\dfrac{u}{a}\right| + C$