

# Formúlublað

## Rétthyrndur þríhyrningur

$$\cos v = \frac{\text{Aðl}}{\text{Lang}} \quad \sin v = \frac{\text{Mótl}}{\text{Lang}} \quad \tan v = \frac{\text{Mótl}}{\text{Aðl}}$$

## Jafna beinnar línu

$$y = hx + k \quad y - y_1 = h(x - x_1)$$

## Fjarlægðarformúla

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

## Hallatala línu

$$h = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

## Miðpunktur striks

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

## Lausnaformúla

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

## Samhverfuás

$$x = \frac{-b}{2a}$$

## Lograr

$$\lg(AB) = \lg A + \lg B \quad \lg\left(\frac{A}{B}\right) = \lg A - \lg B$$

$$\lg A^y = y \lg A$$

## Umraðanir og samantektir

$$P(n, k) = \frac{n!}{(n-k)!}$$

$$C(n, k) = \binom{n}{k} = \frac{P(n, k)}{k!} = \frac{n!}{(n-k)!k!}$$

## Hornaföll

$$\sin(u \pm v) = \sin u \cdot \cos v \pm \cos u \cdot \sin v$$
$$\cos(u \pm v) = \cos u \cdot \cos v \mp \sin u \cdot \sin v$$

$$\sin 2u = 2 \sin u \cdot \cos u$$

$$\cos 2u = \cos^2 u - \sin^2 u$$

$$1 = \cos^2 u + \sin^2 u$$

$$\tan u = \frac{\sin u}{\cos u}$$

## Vigrar

$$\vec{u} \cdot \vec{v} = |\vec{u}| \cdot |\vec{v}| \cdot \cos(\vec{u}, \vec{v})$$

## Afleiður

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{x \rightarrow x_0} \frac{f(x) - f(x_0)}{x - x_0}$$

$$(f \cdot g)' = f' \cdot g + f \cdot g'$$

$$\left(\frac{f}{g}\right)' = \frac{f' \cdot g - f \cdot g'}{g^2}$$

## Keðjuregla

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

## Töluleg heildun

$$T = \frac{f(x_1) + f(x_2)}{2} \cdot h$$

$$M = f(m) \cdot h$$

$$S = \frac{T + 2M}{3}$$

## Runur og raðir

$$a_n = a_1 + (n-1)d$$

$$a_n = a_1 \cdot k^{n-1}$$

$$s = \frac{a_1}{1-k}$$

$$s_n = \frac{n(a_1 + a_n)}{2}$$

$$s_n = \frac{a_1(k^n - 1)}{k - 1}$$

## Hlutheildun

$$\int f(x)g(x) dx = f(x)G(x) - \int f'(x)G(x) dx$$

## Rúmmál

$$V_x = \pi \int_a^b (f(x))^2 dx$$

$$V_x = \pi \int_a^b ((f(x))^2 - (g(x))^2) dx$$

$$V_{y=k} = \pi \int_a^b (f(x) - k)^2 dx$$

$$V_y = 2\pi \int_a^b x|f(x)| dx$$

$$V_y = 2\pi \int_a^b x|f(x) - g(x)| dx$$

$$V_{x=k} = 2\pi \int_a^b (x-k)|f(x) - g(x)| dx \quad \text{ef } k \leq a < b$$

## Bogalengd

$$s = \int_a^b \sqrt{1 + (f'(x))^2} dx$$

## Yfirborðsflatarmál

$$Y_x = 2\pi \int_a^b |f(x)| \sqrt{1 + (f'(x))^2} dx$$

$$Y_y = 2\pi \int_a^b |x| \sqrt{1 + (f'(x))^2} dx$$

## Tvinntölur

$$P(z) = (z^2 - 2\operatorname{Re}(w) \cdot z + |w|^2) \cdot Q(z)$$

$$e^{ix} = \cos x + i \sin x$$

## Deildajöfnur

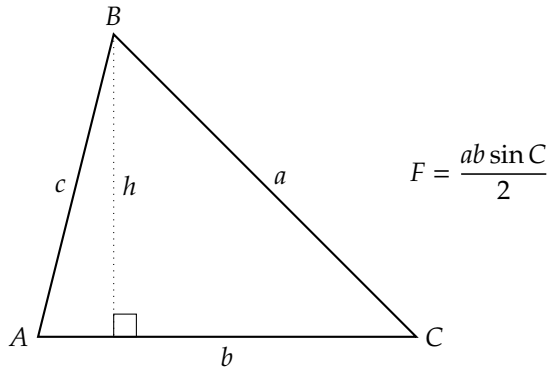
$$y = k_1 e^{\alpha_1 x} + k_2 e^{\alpha_2 x}$$

$$y = e^{px}(k_1 \cos(qx) + k_2 \sin(qx))$$

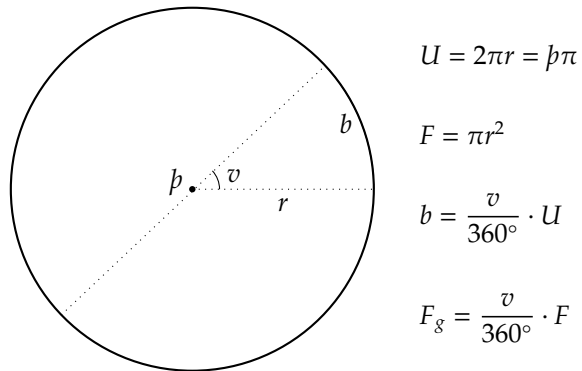
$$y = e^{\alpha x}(k_1 x + k_2)$$

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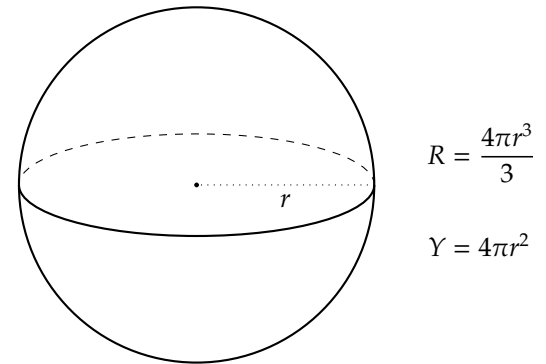
Þríhyrningur



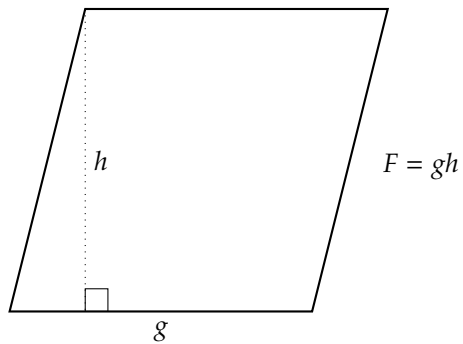
Hringur



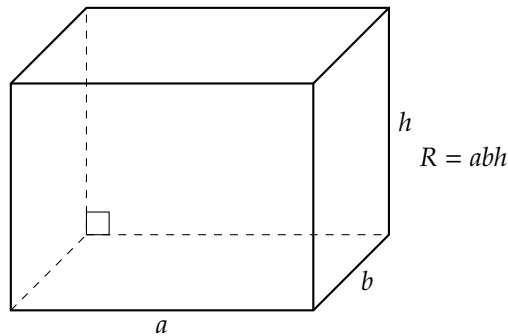
Kúla



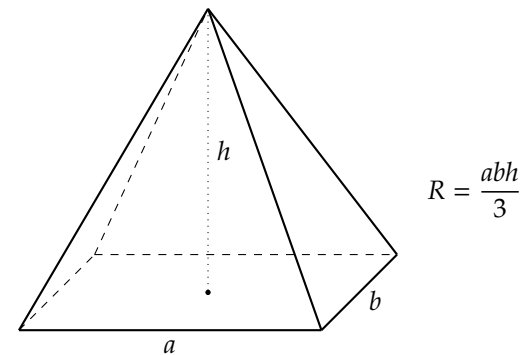
Samsíðungur



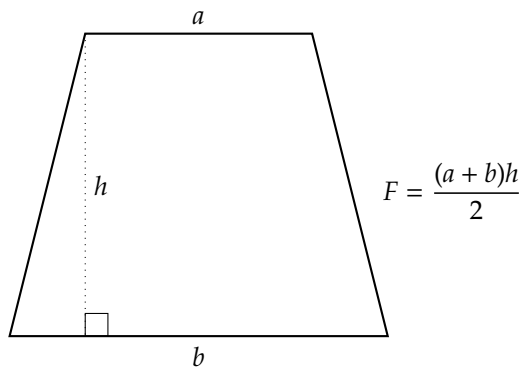
Kassi



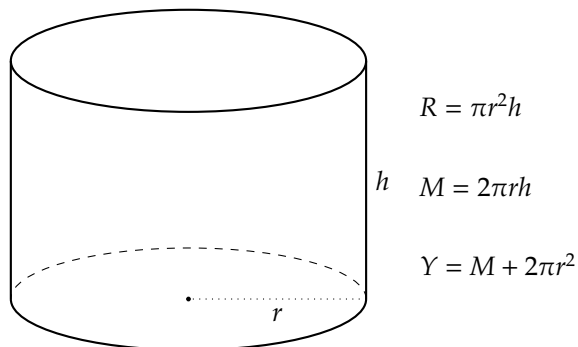
Pýramídi



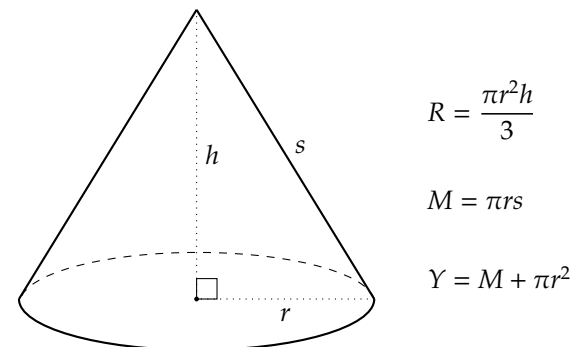
Trapisa



Sívalningur



Keila



# Formúlublað

## Deildunarreglur (Diffurun)

$$\frac{d}{dx} k = 0 \quad (k \text{ er fasti})$$

$$\frac{d}{dx} kf(x) = k \left( \frac{d}{dx} f(x) \right) \quad (k \text{ er fasti})$$

$$\frac{d}{dx} (f(x) \pm g(x)) = f'(x) \pm g'(x)$$

$$\frac{d}{dx} x = 1$$

$$\frac{d}{dx} \sqrt{x} = \frac{1}{2\sqrt{x}}$$

$$\frac{d}{dx} x^n = nx^{n-1}$$

$$\frac{d}{dx} a^x = \ln a \cdot a^x$$

$$\frac{d}{dx} |x| = \frac{x}{|x|}$$

$$\frac{d}{dx} e^{ax} = ae^{ax}$$

$$\frac{d}{dx} \sin x = \cos x$$

$$\frac{d}{dx} \sin ax = a \cos ax$$

$$\frac{d}{dx} \cos x = -\sin x$$

$$\frac{d}{dx} \cos ax = -a \sin ax$$

$$\frac{d}{dx} \tan x = \frac{1}{\cos^2 x} = 1 + \tan^2 x$$

$$\frac{d}{dx} \tan ax = \frac{a}{\cos^2 ax} = a(1 + \tan^2 ax)$$

$$\frac{d}{dx} \ln |x| = \frac{1}{x}$$

$$\frac{d}{dx} \ln |ax + b| = \frac{a}{ax + b}$$

$$\frac{d}{dx} \sin^{-1} x = \frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \cos^{-1} x = -\frac{1}{\sqrt{1-x^2}}$$

$$\frac{d}{dx} \tan^{-1} x = \frac{1}{1+x^2}$$

## Keðjuregla

$$\frac{d}{dx} f(g(x)) = f'(g(x)) \cdot g'(x)$$

## Samsett föll

$$\frac{d}{dx} (f(x) \cdot g(x)) = f'(x) \cdot g(x) + f(x) \cdot g'(x)$$

$$\frac{d}{dx} \left( \frac{f(x)}{g(x)} \right) = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{(g(x))^2}$$

## Hlutheildun

$$\int f(u)g'(u) du = f(u)g(u) - \int f'(u)g(u) du$$

## Meðalgildi

$$m(f) = \frac{1}{b-a} \int_a^b f(u) du$$

## Heildunarreglur (Tegrun)

$$\int du = u + C$$

$$\int k du = ku + C \quad (k \text{ er fasti})$$

$$\int (du \pm dv) = \int du \pm \int dv$$

$$\int u^n du = \frac{u^{n+1}}{n+1} + C \quad (n \neq -1)$$

$$\int \frac{du}{u} = \ln |u| + C$$

$$\int a^u du = \frac{a^u}{\ln a} + C \quad a > 0, a \neq 1$$

$$\int e^u du = e^u + C$$

$$\int e^{bu} du = \frac{e^{bu}}{b} + C \quad (b \neq 0)$$

$$\int \sin u du = -\cos u + C$$

$$\int \sin bu du = -\frac{\cos bu}{b} + C \quad (b \neq 0)$$

$$\int \cos u du = \sin u + C$$

$$\int \cos bu du = \frac{\sin bu}{b} + C \quad (b \neq 0)$$

$$\int \frac{1}{u+b} du = \ln |u+b| + C$$

$$\int \frac{1}{au+b} du = \frac{1}{a} \ln |au+b| + C$$

$$\int \frac{1}{\cos^2 u} du = \tan u + C$$

$$\int \frac{1}{\sin^2 u} du = -\frac{1}{\tan u} + C$$

$$\int \frac{\tan u}{\cos u} du = \frac{1}{\cos u} + C$$

$$\int \tan u du = -\ln |\cos u| + C$$

$$\int \frac{1}{\tan u} du = \ln |\sin u| + C$$

$$\int \frac{du}{a^2 + u^2} = \frac{1}{a} \tan^{-1} \left( \frac{u}{a} \right) + C$$

$$\int \frac{du}{a^2 - u^2} = \frac{1}{2a} \ln \left| \frac{u+a}{u-a} \right| + C$$