

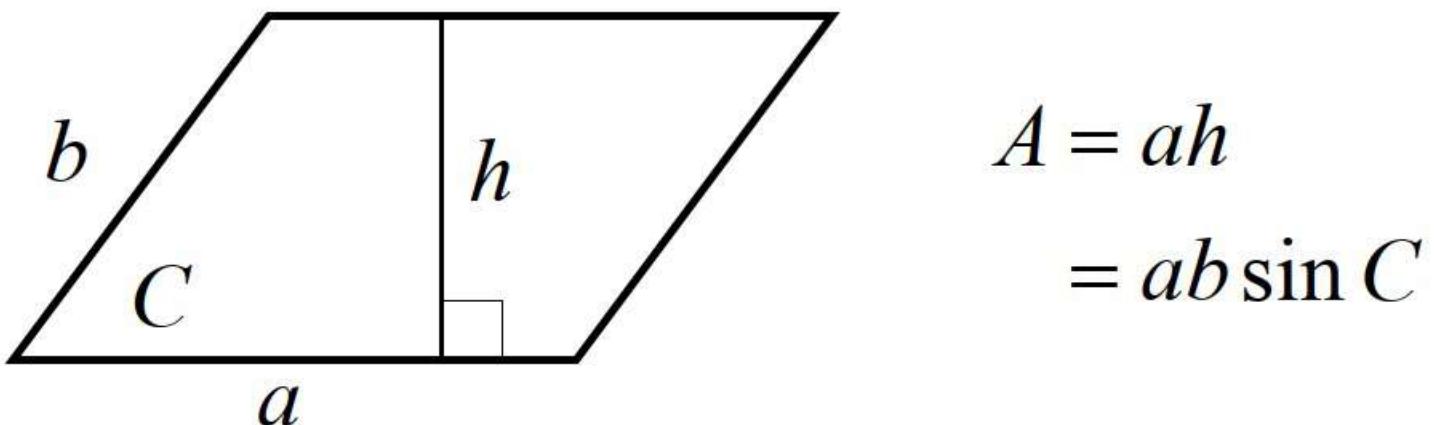
Fad agus achar

Seasann A iontu seo a leanas
d'achar na fíorach atá i gceist.

Length and area

In the following, A represents the
area of the shape in question.

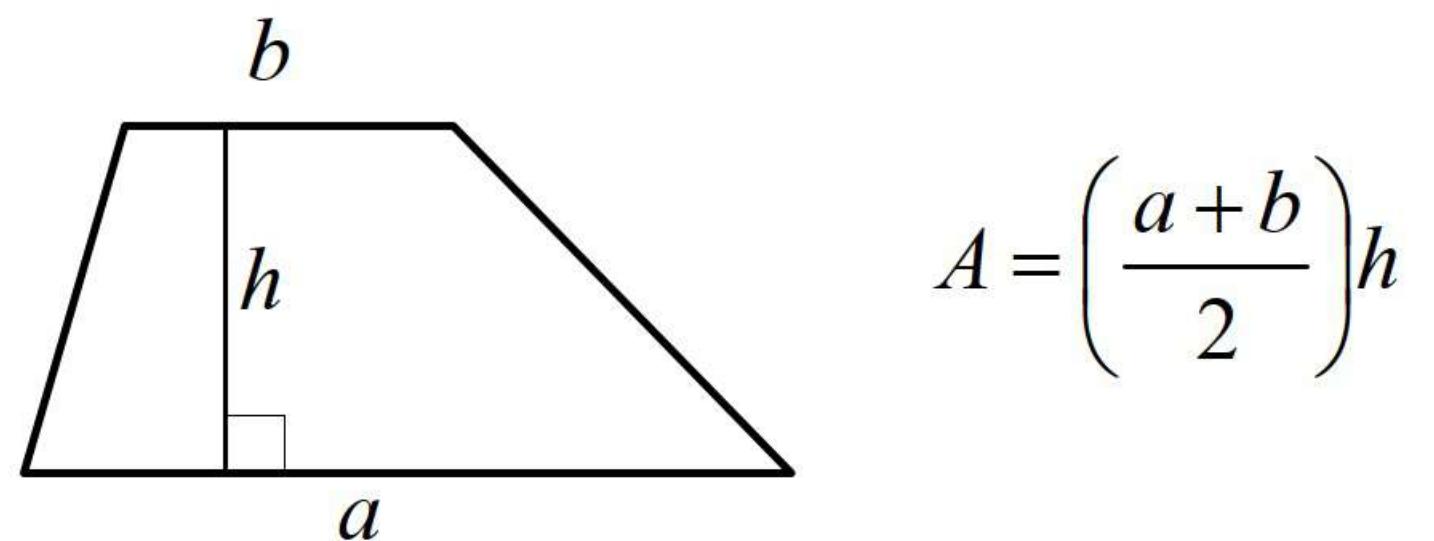
Comhthreomharán



$$A = ah \\ = ab \sin C$$

Parallelogram

Traipéisiam

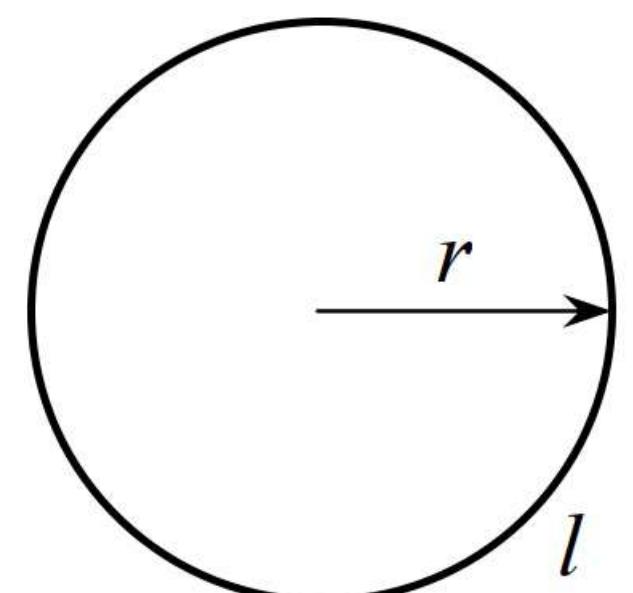


$$A = \left(\frac{a+b}{2} \right) h$$

Trapezium

Ciorcal / Diosca

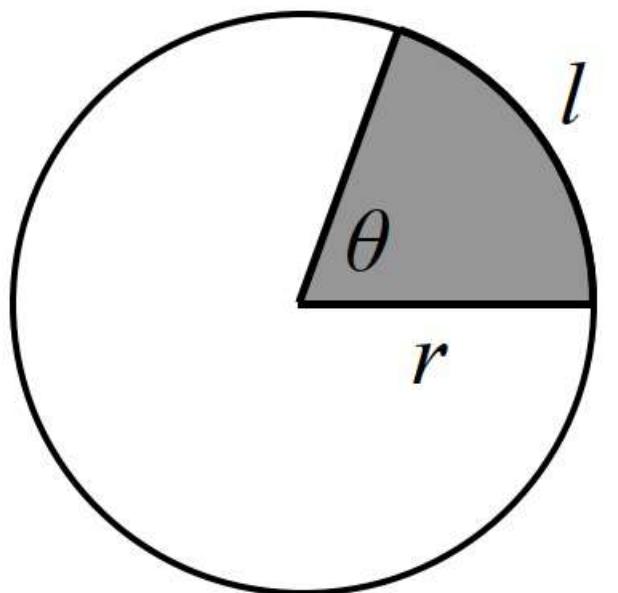
fad l
(imlíne l)



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

Circle / Disc

length l
(circumference l)

Stua / Teascóg**Arc / Sector**

nuair is ina raidiain atá θ

$$l = r\theta$$

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

when θ is in radians

nuair is ina chéimeanna atá θ

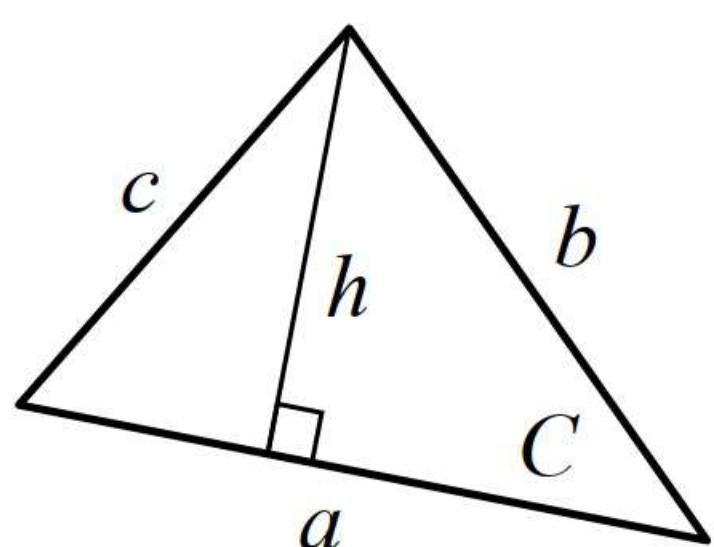
$$l = 2\pi r \left(\frac{\theta}{360^\circ} \right)$$

$$A = \pi r^2 \left(\frac{\theta}{360^\circ} \right)$$

when θ is in degrees

Triantán

$$\text{áit a bhfuil } s = \frac{a + b + c}{2}$$



$$\begin{aligned} A &= \frac{1}{2}ah \\ &= \frac{1}{2}ab \sin C \\ &= \sqrt{s(s-a)(s-b)(s-c)} \end{aligned}$$

Triangle

$$\text{taking } s = \frac{a + b + c}{2}$$

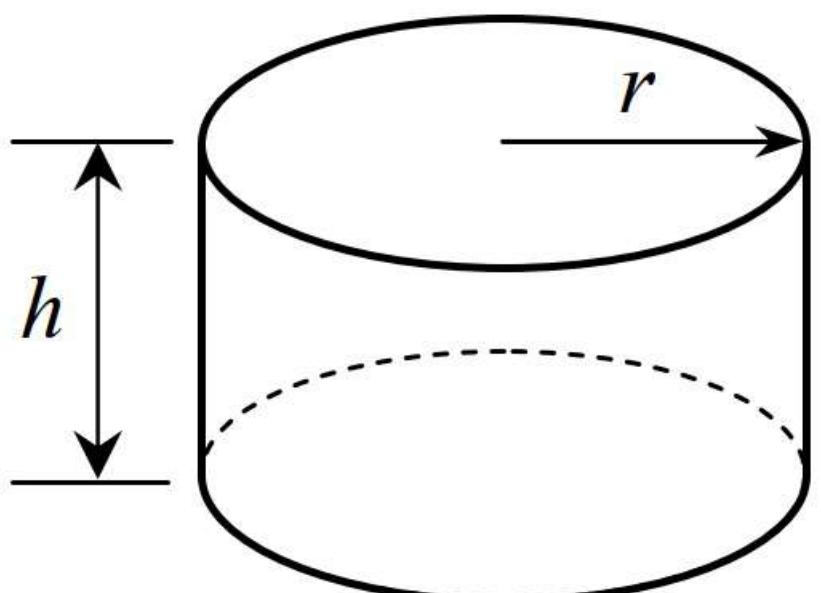
Achar dromchla agus toirt

Seasann A iontu seo d'achar **cuar** an dromchla agus seasann V do thoirt an tsolaid atá i gceist.

Surface area and volume

In the following, A represents the **curved** surface area and V represents the volume of the solid in question.

Sorcóir

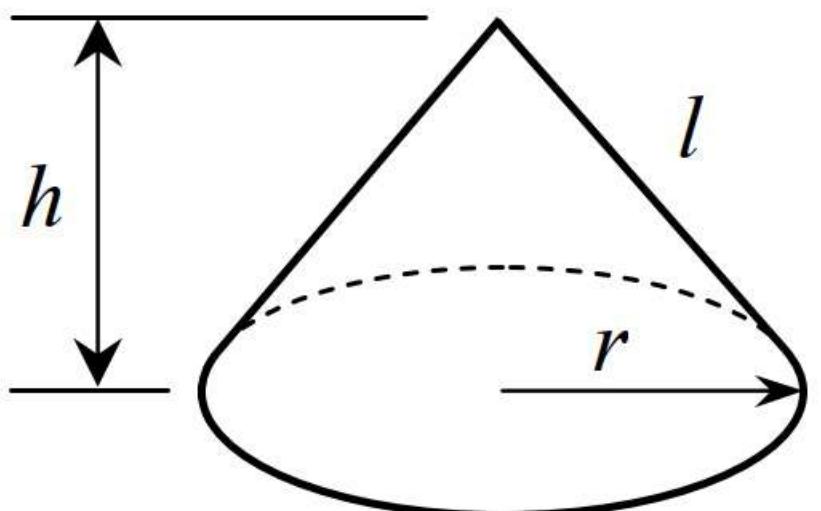


$$A = 2\pi rh$$

Cylinder

$$V = \pi r^2 h$$

Cón

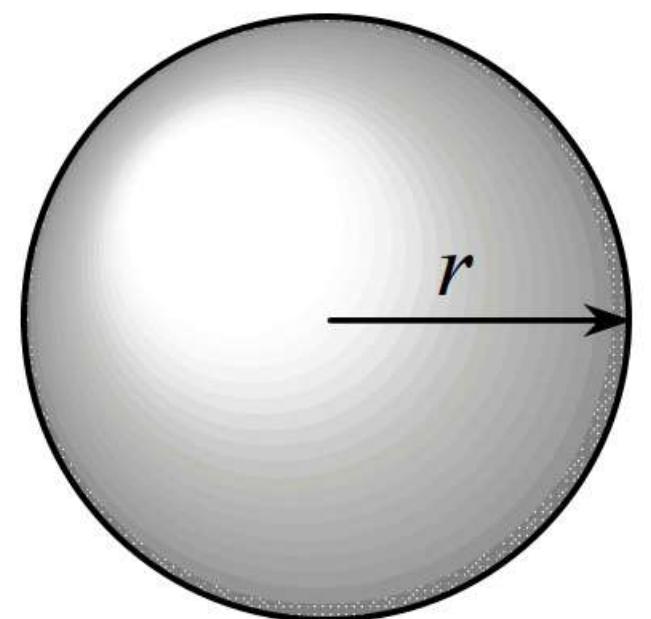


$$A = \pi rl$$

Cone

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

Sfear

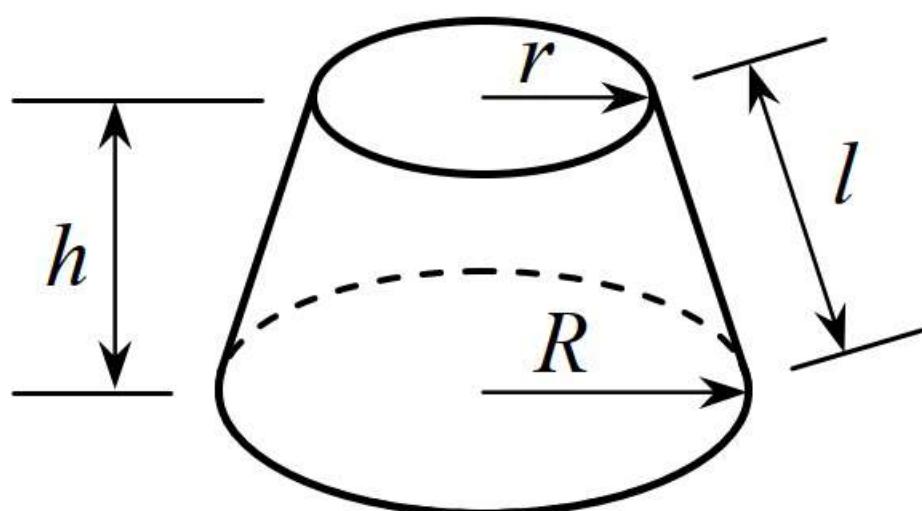


$$A = 4\pi r^2$$

Sphere

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

Frustum cón

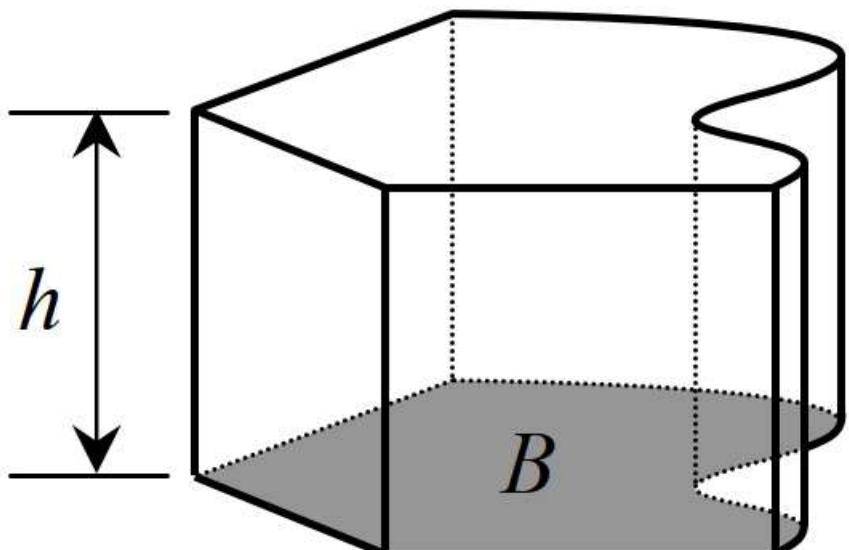


$$A = \pi(r + R)l$$

$$V = \frac{1}{3}\pi h(R^2 + Rr + r^2)$$

Frustum of cone

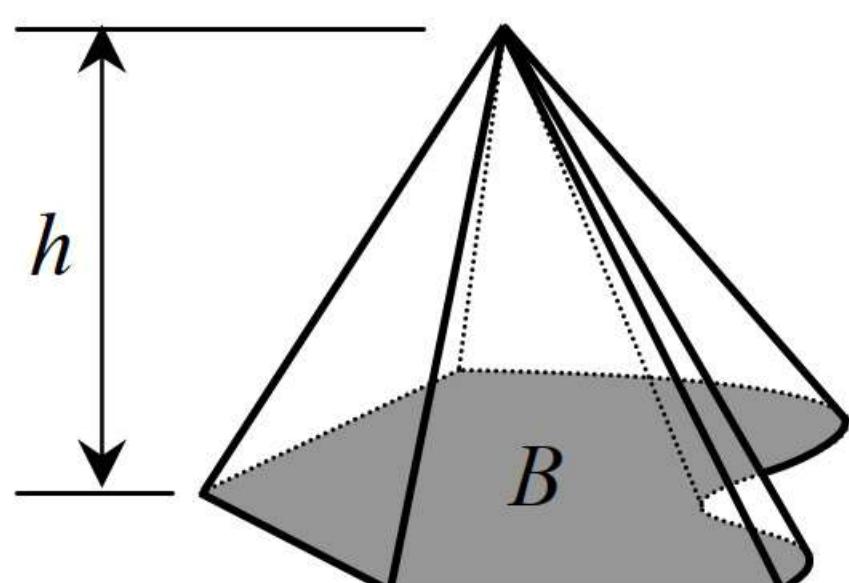
**Solad de thrasghearradh
aonfhoirmmeach (priosma)**
áit arb é B achar an bhoinn



$$V = Bh$$

**Solid of uniform
cross-section (prism)**
taking B as the area
of the base

Pirimid ar bhonn ar bith
áit arb é B achar an bhoinn



$$V = \frac{1}{3}Bh$$

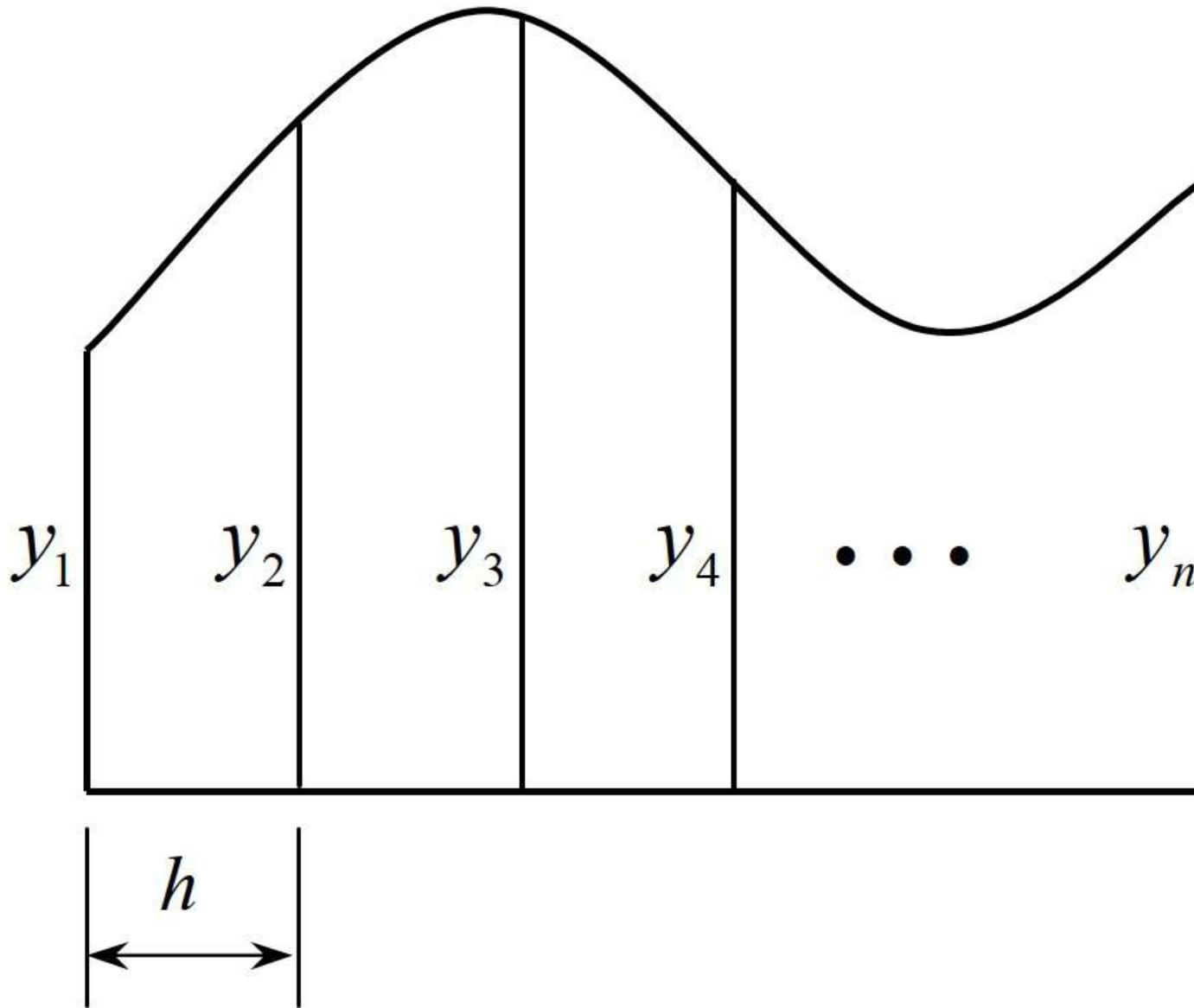
Pyramid on any base
taking B as the area
of the base

Meastacháin ar achar

Seasann A d'achar na fiorach.

Area approximations

A represents the area of the shape.



Riail thraigéasóideach

$$A \approx \frac{h}{2} [y_1 + y_n + 2(y_2 + y_3 + y_4 + \dots + y_{n-1})]$$

Trapezoidal rule

Riail Simpson áit ar corruimhir n

$$A \approx \frac{h}{3} [y_1 + y_n + 2(y_3 + y_5 + \dots + y_{n-2}) + 4(y_2 + y_4 + \dots + y_{n-1})]$$

Simpson's rule for odd n

Siombailí na dtacar

		Set symbols
idirmhír	\cap	intersection
aontas	\cup	union
difríocht (lúide)	\setminus	difference (less)
difríocht shiméadrach	Δ	symmetric difference
fothacar de	\subset	is a subset of
ball de	\in	is an element of
tacar nialasach	\emptyset	null set

Tacair uimhreacha

		Number sets
uimhreacha aiceanta	$\mathbb{N} = \{1, 2, 3, 4, 5, 6, \dots\}$	natural numbers
slánuimhreacha	$\mathbb{Z} = \{\dots -3, -2, -1, 0, 1, 2, 3, \dots\}$	integers
uimhreacha cóimheasta	$\mathbb{Q} = \left\{ \frac{p}{q} \mid p \in \mathbb{Z}, \quad q \in \mathbb{Z}, \quad q \neq 0 \right\}$	rational numbers
réaduimhreacha	\mathbb{R}	real numbers
uimhreacha coimpléascacha	$\mathbb{C} = \{a + bi \mid a \in \mathbb{R}, \quad b \in \mathbb{R}, \quad i^2 = -1\}$	complex numbers

fréamhacha na cothromóide cearnaí
 $ax^2 + bx + c = 0$

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

roots of the quadratic equation
 $ax^2 + bx + c = 0$

inbhéarta na maitríse $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ leis an
 deitéalmanant $\det(A) = ad - bc \neq 0$

$$\frac{1}{\det(A)} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix}$$

inverse of the matrix $A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$ with
 determinant $\det(A) = ad - bc \neq 0$

Teoirim de Moivre

$$[r(\cos \theta + i \sin \theta)]^n = r^n (\cos n\theta + i \sin n\theta) = r^n e^{in\theta}$$

De Moivre's theorem

An Teoirim dhéthéarmach

$$(x + y)^n = \sum_{r=0}^n \binom{n}{r} x^{n-r} y^r = \binom{n}{0} x^n + \binom{n}{1} x^{n-1} y + \binom{n}{2} x^{n-2} y^2 + \cdots + \binom{n}{r} x^{n-r} y^r + \cdots + \binom{n}{n} y^n$$

comhéifeachtaí déthéarmacha

$$\binom{n}{r} = {}^n C_r = C(n, r) = \frac{n!}{r!(n-r)!}$$

Binomial theorem

binomial coefficients

Siombailí loighce		Logic symbols
AND	\wedge	AND
OR	\vee	OR
NOT	\neg	NOT
NAND	\uparrow	NAND
NOR	\downarrow	NOR
tugann le fios	\Rightarrow	implies
coibhéiseach le	\Leftrightarrow	is equivalent to
do gach	\forall	for all
tá...ann	\exists	there exists
a thugann	\vdash	yields, (infer)
dá réir sin	\therefore	therefore
Dlíthe de Morgan	$\neg(A \wedge B) \Leftrightarrow (\neg A) \vee (\neg B)$ $\neg(A \vee B) \Leftrightarrow (\neg A) \wedge (\neg B)$	De Morgan's laws
Séanadh agus cainníochtóirí	$\neg((\forall x)A(x)) \Leftrightarrow (\exists x)(\neg A(x))$ $\neg((\exists x)A(x)) \Leftrightarrow (\forall x)(\neg A(x))$	Negation and quantifiers

Díorthaigh

Derivatives

$f(x)$	$f'(x)$
x^n	nx^{n-1}
$\ln x$	$\frac{1}{x}$
e^x	e^x
e^{ax}	ae^{ax}
a^x	$a^x \ln a$
$\cos x$	$-\sin x$
$\sin x$	$\cos x$
$\tan x$	$\sec^2 x$
$\cos^{-1} \frac{x}{a}$	$-\frac{1}{\sqrt{a^2 - x^2}}$
$\sin^{-1} \frac{x}{a}$	$\frac{1}{\sqrt{a^2 - x^2}}$
$\tan^{-1} \frac{x}{a}$	$\frac{a}{a^2 + x^2}$

Riail an toraidh

$$\Rightarrow \frac{dy}{dx} = u \frac{dv}{dx} + v \frac{du}{dx}$$

Product rule

Riail an lín

$$\Rightarrow \frac{dy}{dx} = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v^2}$$

Quotient rule

Cuingriail

$$\Rightarrow f'(x) = \frac{du}{dv} \frac{dv}{dx}$$

Chain rule

Matamaitic an airgeadais

Iontu seo a leanas, is é t an fad ama ina bhlianta agus is é i an ráta bliantúil úis, dímheasa nó fáis, agus é sloinnte mar dheachúil nó mar chodán (ionas go seasann $i = 0.08$ do ráta 8%, mar shampla)*.

Ús iolraithe

F = luach deiridh, P = príomhshuim

Luach láithreach

P = luach láithreach, F = luach deiridh

Dímheas

– modh an chomhardaithe laghdaithigh

F = luach déanach, P = luach tosaigh

Dímheas

– an modh dronlínéach

A = méid an dímheasa bhliantúil

P = luach tosaigh, S = dramhluach

t = saolré eacnamaíoch fhóntha

Financial mathematics

In all of the following, t is the time in years and i is annual rate of interest, depreciation or growth, expressed as a decimal or fraction (so that, for example, $i = 0.08$ represents a rate of 8%)*.

$$F = P(1 + i)^t$$

Compound interest

F = final value, P = principal

$$P = \frac{F}{(1 + i)^t}$$

Present value

P = present value, F = final value

$$F = P(1 - i)^t$$

Depreciation

– reducing balance method

F = later value, P = initial value

$$A = \frac{P - S}{t}$$

Depreciation

– straight line method

A = annual depreciation amount

P = initial value, S = scrap value

t = useful economic life

*Bíonn feidhm ag na foirmlí sin freisin nuair a bhítear ag athiolrú i gceann eatraimh chothroma seachas blianta. Sa chás sin, déantar t a thomhas sa tréimhse chuí ama, agus is é i an ráta don tréimhse.

*The formulae also apply when compounding at equal intervals other than years. In such cases, t is measured in the relevant periods of time, and i is the period rate.