

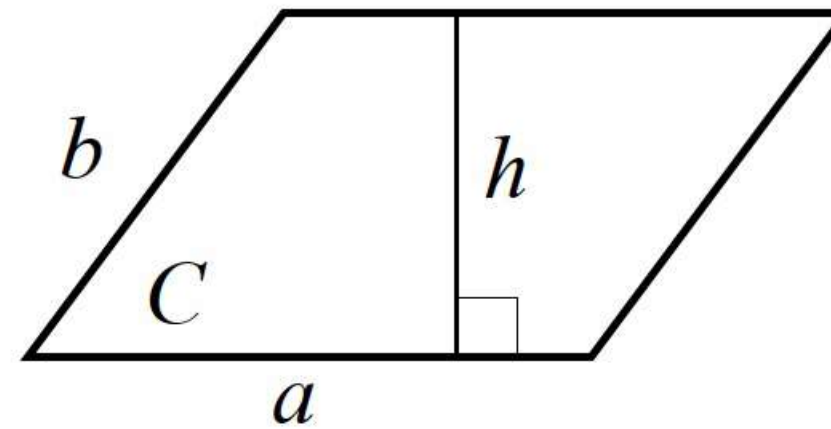
Fad agus achar

Length and area

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

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

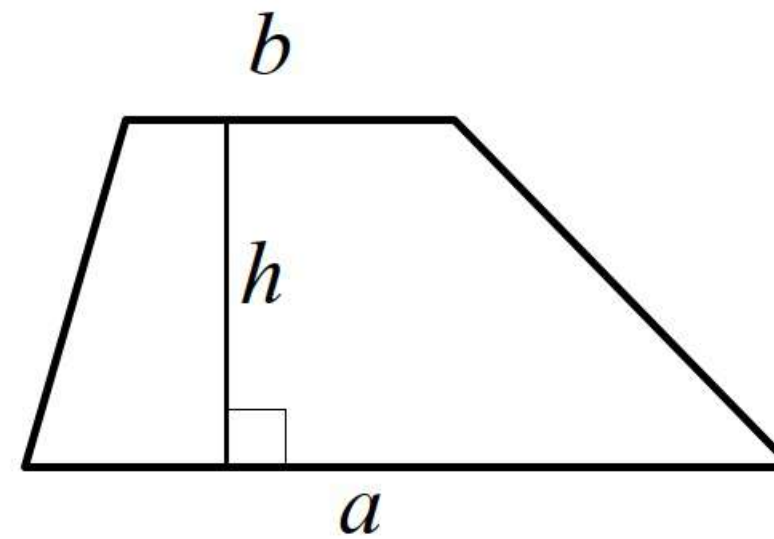
Comhthreomharán



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

Parallelogram

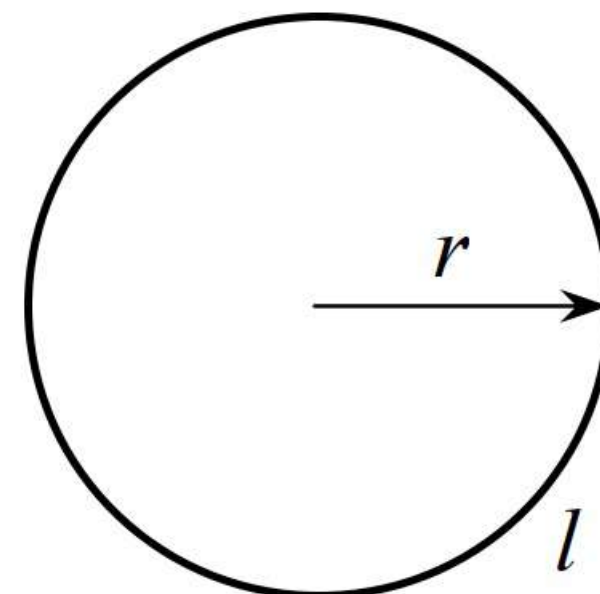
Traipéisiam



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

Trapezium

Ciorcal / Diosca

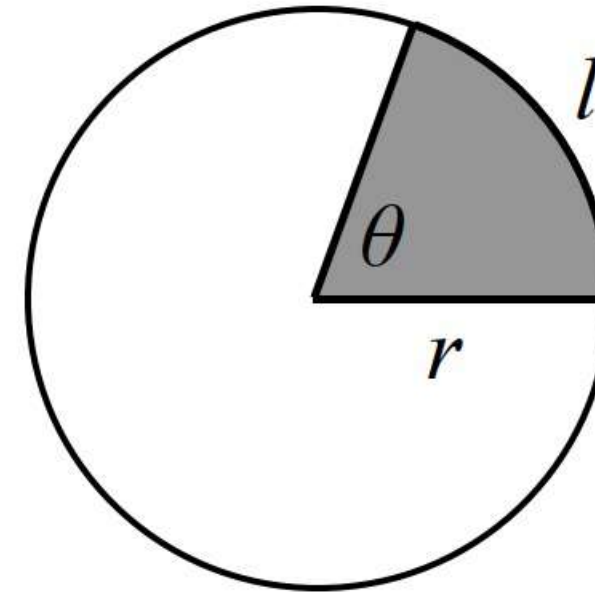


$$l = 2\pi r$$
$$A = \pi r^2$$

Circle / Disc

fad l
(imlíne l)

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

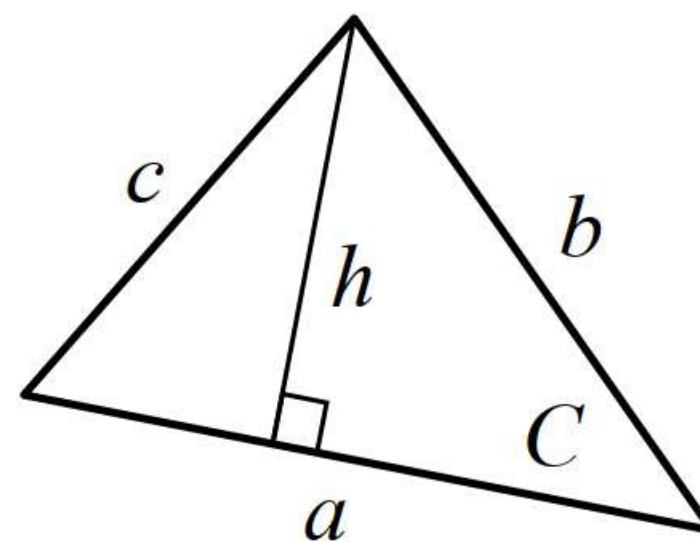
$$l = 2\pi r \left(\frac{\theta}{360^\circ} \right)$$

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

when θ is in degrees

Triantán

áit a bhfuil $s = \frac{a+b+c}{2}$



$$A = \frac{1}{2}ah$$

$$= \frac{1}{2}ab \sin C$$

$$= \sqrt{s(s-a)(s-b)(s-c)}$$

Triangle

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

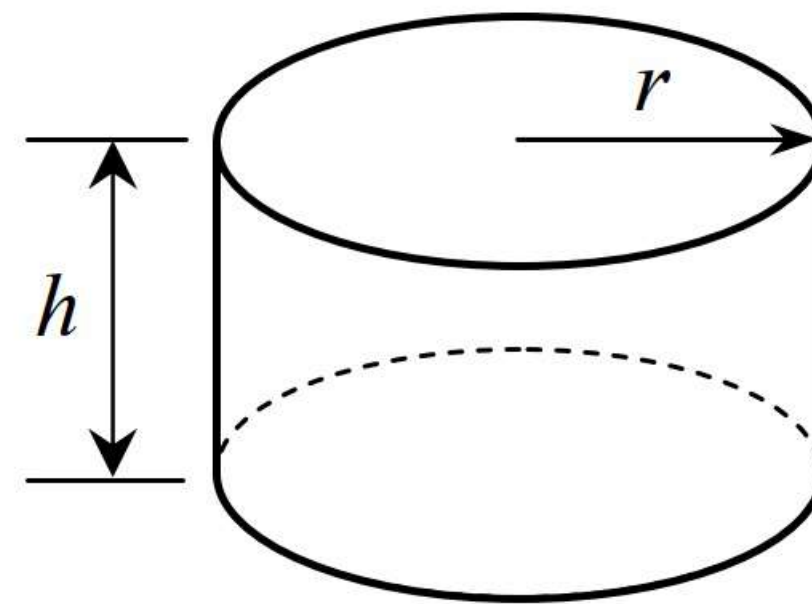
Achar dromchla agus toirt

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

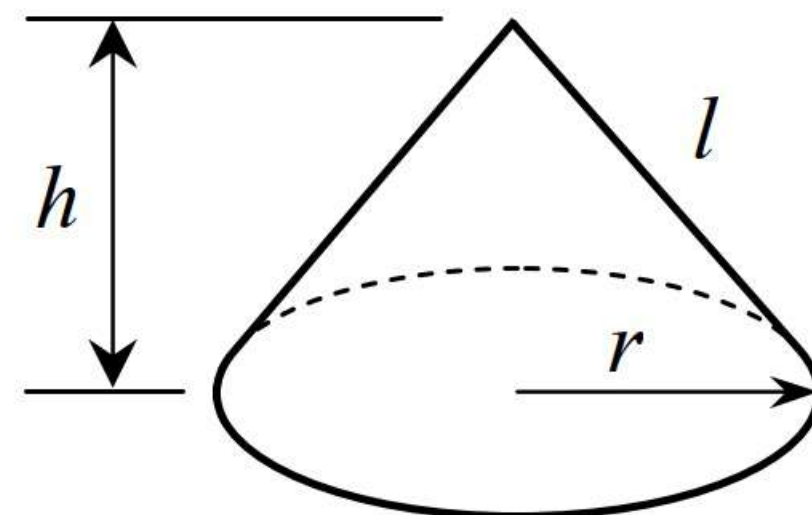


$$A = 2\pi rh$$

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

Cylinder

Cón

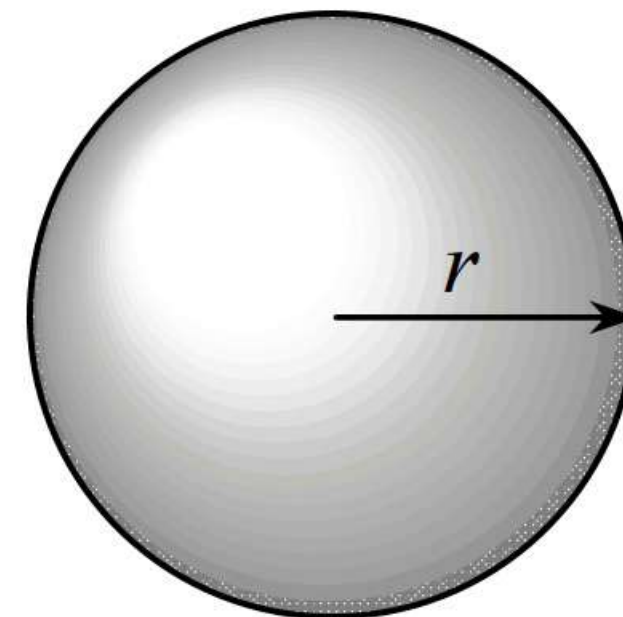


$$A = \pi rl$$

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

Cone

Sféar

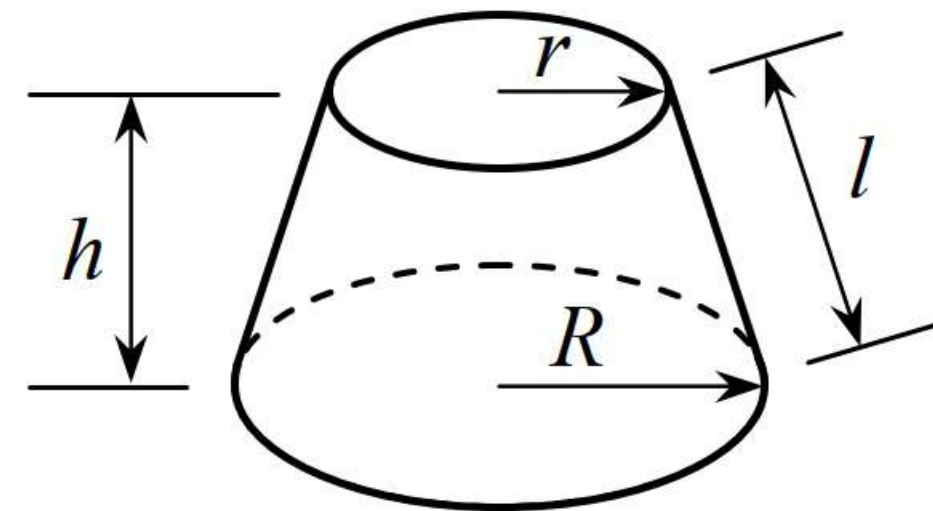


$$A = 4\pi r^2$$

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

Sphere

Frustam cóin



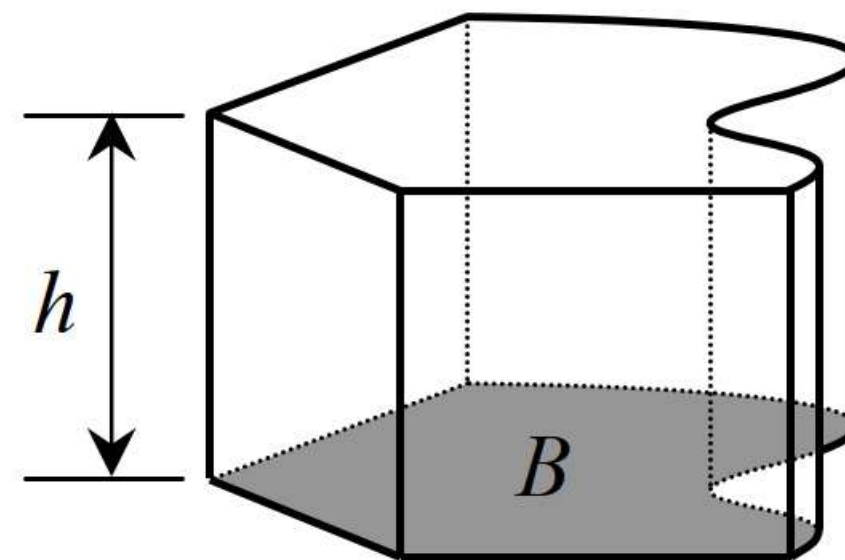
$$A = \pi(r + R)l$$

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

Frustum of cone

**Solad de thrasghearradh
aonfhoirmeach (priosma)**

áit arb é B achar an bhoinn



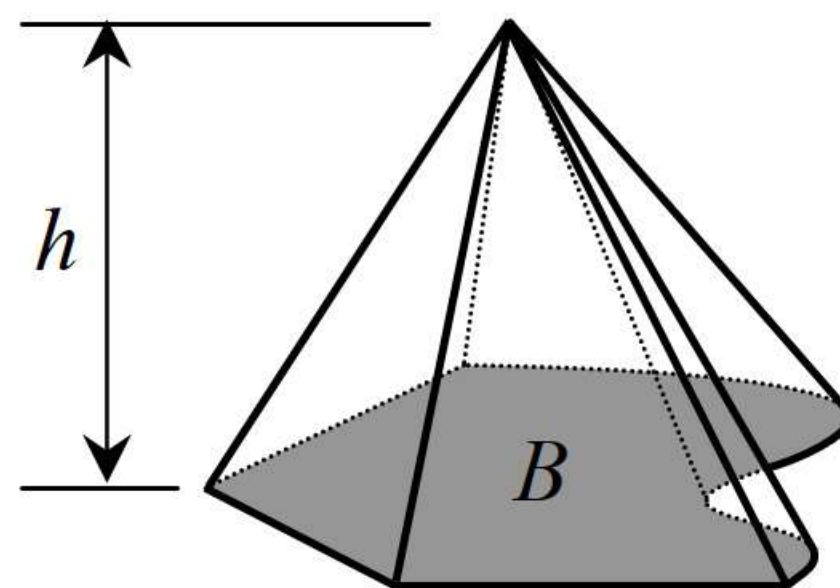
$$V = Bh$$

**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

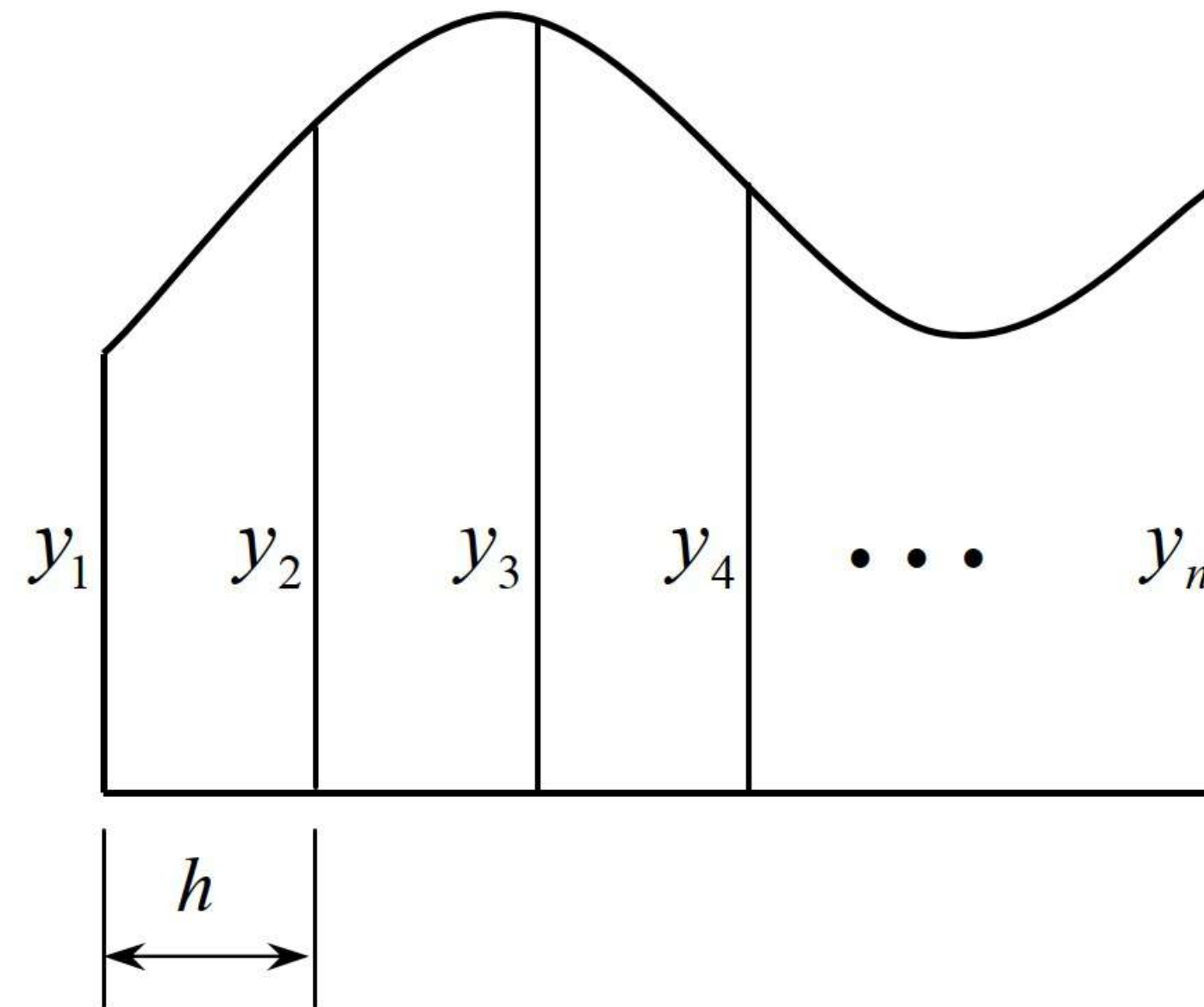
taking B as the area
of the base

Meastacháin ar achar

Area approximations

Seasann A d'achar na fíorach.

A represents the area of the shape.



**Riail
thraipéasóideach**

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

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	$\mathbb{Q} = \left\{ \frac{p}{q} \mid p \in \mathbb{Z}, q \in \mathbb{Z}, q \neq 0 \right\}$	rational numbers
réaduimhreacha	\mathbb{R}	real numbers
uimhreacha coimpléascacha	$\mathbb{C} = \{a + bi \mid a \in \mathbb{R}, b \in \mathbb{R}, i^2 = -1\}$	complex numbers

Ailgéabar

Algebra

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
deitéarmanant $\det(A) = ad - bc \neq 0$

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

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

Teoirim de Moivre

De Moivre's theorem

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

An Teoirim dhéthéarmach

Binomial theorem

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

comhéifeachtaí déthéarmacha

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

binomial 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	$\neg(A \wedge B) \Leftrightarrow (\neg A) \vee (\neg B)$	De Morgan's laws	
	$\neg(A \vee B) \Leftrightarrow (\neg A) \wedge (\neg B)$		
Séanadh agus cainníochtóirí	$\neg((\forall x)A(x)) \Leftrightarrow (\exists x)(\neg A(x))$	Negation and quantifiers	
	$\neg((\exists x)A(x)) \Leftrightarrow (\forall x)(\neg A(x))$		

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

$$y = uv$$

Product rule

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

Riail an lín

$$y = \frac{u}{v}$$

Quotient rule

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

Cuingriail

$$f(x) = u(v(x))$$

Chain rule

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

Matamaitic an airgeadais

Financial mathematics

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)*.

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%)*.

Ús iolraithe

F = luach deiridh, P = príomhshuim

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

Compound interest

F = final value, P = principal

Luach láithreach

P = luach láithreach, F = luach deiridh

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

Present value

P = present value, F = final value

Dímheas

– modh an chomhardaithe laghdaithigh

F = luach déanach, P = luach tosaigh

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

Depreciation

– reducing balance method

F = later value, P = initial value

Dímheas

– an modh dronlíneach

A = méid an dímheasa bhliantúil

P = luach tosaigh, S = dramhluach

t = saolré eacnamaíoch fhónta

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

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 athiolarú 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.