



CICM 2016, OpenMath workshop

Displaying formulae in Wikimedia's Central Data Storage Wikidata



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with material from Katie Filbert



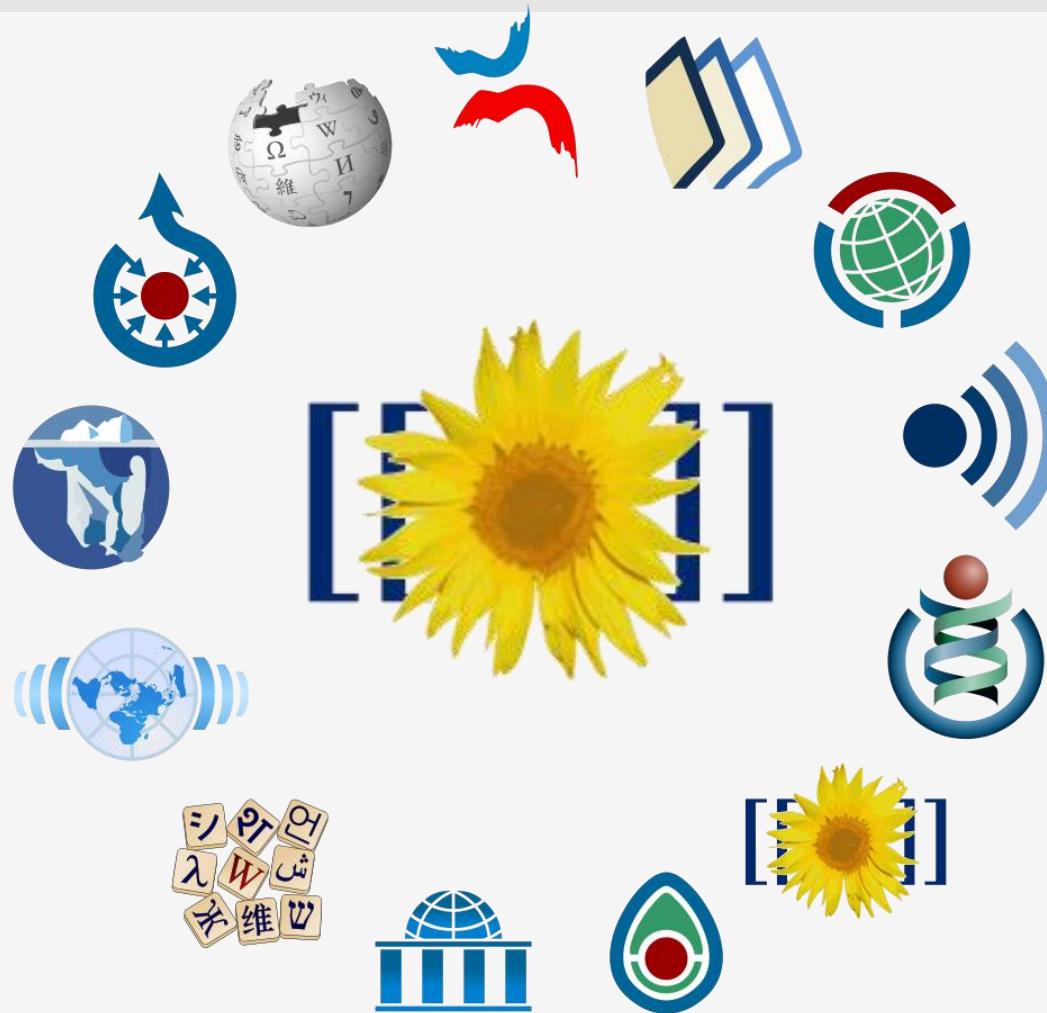


What is Wikidata?

- repository of the world's knowledge
- structured database anyone can read and edit
- multi-lingual
- free and open source data (CC-0) and software



Wikidata supports Wikimedia projects





> 20 M Items

>88 M Statements



Example item

www.wikidata.org/wiki/Q60

New York City



Example item

New York City (Q60)

city in state of New York, United States; most populous metropolitan area in United States
NYC | New York | City of New York | New York, New York | The Big Apple | New Amsterdam | New York City, New York | New-York City | New-York

[edit](#)

Wikipedia (209 entries) [edit](#)

▼ In more languages

Language	Label	Description	Also known as
English	New York City	city in state of New York, United States; most populous metropolitan area in United States	NYC New York City of New York New York, New York The Big Apple New Amsterdam New York City, New York New-York City New-York
Arabic		مدينة نيويورك	No description defined
German	New York City	Metropole an der Ostküste der Vereinigten Staaten	City of New York The Big Apple NYC New York City
Spanish	Nueva York	ciudad de Estados Unidos	New York City ciudad de Nueva York NYC New York
Japanese	ニューヨーク	ニューヨーク州の都市	

[More languages](#)

af New York Stad

als New York City

am Նյու Յու և ամ

ang Nïweoforwicburg

an Nueva York

arc (ମୁଁବା ମେଲ୍ଲ ମୋ)

ar نیویورک

arz نیویورک

ast Nueva York

as নিউয়ার্ক মহানগর

ay New York

azبۇرۇڭ

az Nyu-York

bar New York City

bat_smg Njoiuorks

ba Нью-Йорк

bcl Nueva York

be_x_old Нью-Ёрк

be Горад Нью-Ёрк

bg Ню Йорк

bh ন্যূয়ার্ক

bjn New York

bn নিউ ইয়ার্ক সিটি

bo ད୍ୱୁୱେର୍କା

br New York

bs New York City

bug Kuta New York

bxr Нью-Йорк хото

ca Nova York

cdo Niū-iók-ché

ceb Dakbayan sa New York

ce Нью-Йорк

Statements

topic's main Wikimedia portal	Portal:New York City	edit
	▼ 0 references	+ add reference

+ add reference

+ add



Example statements

head of government

Bill de Blasio  edit

start time 1 January 2014

▼ 0 references

+ add reference

Michael Bloomberg  edit

start time 1 January 2002

end time 31 December 2013

▼ 1 reference

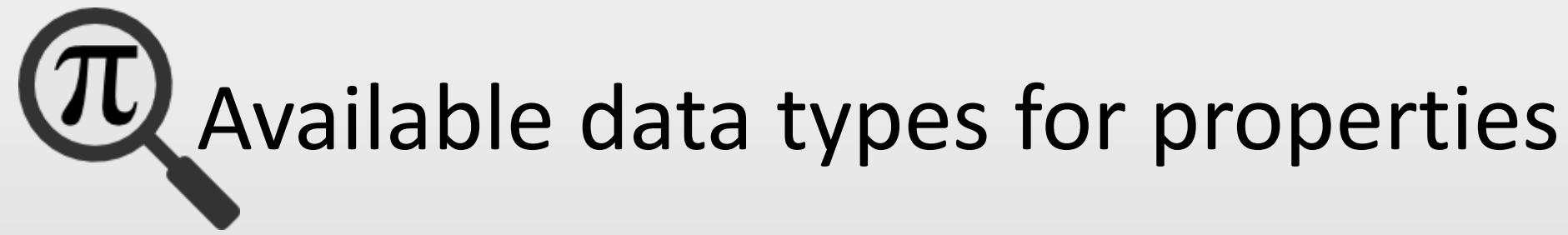
publisher The New York Times

publication date 2 January 2002

reference URL <http://www.nytimes.com/2002/01/02/opinion/the-bloomberg-era-begins.html>

title The Bloomberg Era Begins
(English)

+ add reference



Available data types for properties

- Commons media (image, flag image, video, ...)
- Globe coordinate (coordinate location, ...)
- Identifier (geonames id, VIAF identifier, ...)
- **Math (defining formula)**
- Monolingual text (motto text, official name, ...)
- Quantity - optionally, with units (area, population, ...)
- String (formatter URL, serials ordinal, ...)
- Time (date of birth, point in time, ...)
- URL (official website, ...)
- Wikibase item (instance of, head of government, ...)
- Wikibase property (inverse of, subproperty of, ...)



Wikidata API

MediaWiki API help

This is an auto-generated MediaWiki API documentation page.

Documentation and examples: <https://www.mediawiki.org/wiki/API>

action=wbsetclaim

([main](#) | [wbsetclaim](#))

Creates or updates an entire Statement or Claim.

Parameters:

claim: Statement or Claim serialization

This parameter is required.

index: The index within the entity's list of statements to move the statement to. Optional. Be aware that when setting an index that specifies a position not next to a statement whose main snak does not feature the same property, the whole group of statements whose main snaks feature the same property is moved. When not provided, an existing statement will stay in place while a new statement will be appended to the last one whose main snak features the same property.

Type: integer

summary: Summary for the edit. Will be prepended by an automatically generated comment. The length limit of the autocomment together with the summary is 260 characters. Be aware that everything above that limit will be cut off.

token: A "csrf" token retrieved from [action=query&meta=tokens](#)

This parameter is required.

baserevid: The numeric identifier for the revision to base the modification on. This is used for detecting conflicts during save.

Type: integer

bot: Mark this edit as bot. This URL flag will only be respected if the user belongs to the group "bot".

Type: boolean ([details](#))

- This module requires read rights.
- This module requires write rights.
- This module only accepts POST requests.
- Source: Wikibase Repository
- License: [GPL-2.0+](#)

<https://www.wikidata.org/w/api.php>



Wikipedia integration

Featured content
Current events
Random article
Donate to Wikipedia
Wikipedia store

Interaction
Help
About Wikipedia
Community portal
Recent changes
Contact page

Tools
What links here
Related changes
Upload file
Special pages
Permanent link
Page information
[Wikidata item](#)

Cite this page

Page size

Print/export

Create a book

Barack Hussein Obama II (US */bə'ra:k hu:'seɪn ə'bɑ:mə/*; born August 4, 1961) is the [44th](#) and current President of the United States, and the [first African American](#) to hold the office. Born in [Honolulu, Hawaii](#), Obama is a graduate of [Columbia University](#) and [Harvard Law School](#), where he served as president of the [Harvard Law Review](#). He was a [community organizer](#) in Chicago before earning his law degree. He worked as a [civil rights](#) attorney and taught [constitutional law](#) at [University of Chicago Law School](#) between 1992 and 2004. He [served three terms](#) representing the 13th District in the [Illinois Senate](#) from 1997 to 2004, [running unsuccessfully](#) for the [United States House of Representatives](#) in 2000 to [Bobby Rush](#).

In 2004, Obama received national attention during his [campaign to represent Illinois](#) in the [United States Senate](#) with his victory in the March Democratic Party primary, his [keynote address](#) at the [Democratic National Convention](#) in July, and his election to the Senate in November. He began his presidential campaign in 2007 and, after a [close primary campaign](#) against [Hillary Rodham Clinton](#) in 2008, he won sufficient delegates in the [Democratic Party primaries](#) to receive the presidential nomination. He then defeated [Republican nominee John McCain](#) in the [general election](#), and was [inaugurated as president](#) on January 20, 2009. Nine months after his inauguration, Obama was

Barack Obama



44th President of the United States

Incumbent

Assumed office

January 20, 2009

Vice President Joe Biden

Preceded by George W. Bush

United States Senator



Data used on Wikipedia

and Wikimedia sister projects (e.g. Wikivoyage)

- Language links
- Property parser function
 - {{#property:P17}}
 - {{#property:country}}
 - {{#property:P18|from=Q147}}
- Lua



Property parser function



B I | ► Advanced ► Special characters ► Help

Templates ▾ | Named references Error check

```
[[File:{{#property:P18|from=Q147}}|240px]]
```



scope
design
istant,

coming

a-
The
id the

South Pole Telescope



Location(s)	Amundsen–Scott South Pole Station, Antarctic Treaty area
Coordinates	90°S 0°E
Altitude	2.8±0.1 kilometre
Built	November 2006–February 2007
First light	16 February 2007
Telescope style	Gregorian telescope
Diameter	10.0±0.1 metre
Collecting area	78.5±0.1 square metre
Website	pole.uchicago.edu
	Related media on Wikimedia Commons
	[edit on Wikidata]

Content that violates any copyrights will be deleted. Encyclopedic content must be—by anyone—subject to certain terms and conditions.

B I Advanced Special characters Help Cite

Templates Named references Error check

{{Infobox telescope}}

The South Pole Telescope (SPT) is a 10 [[metre|meter]] [[Amundsen–Scott South Pole Station]], Antarctica. The telescope [[extremely high frequency|millimeter-wave]], and [[terahertz ra

```
 {{infobox
 | bodyclass = vcard
 | aboveclass = fn org
 | title = {{{name|{{PAGENAME}}}}}

 | image = {{#invoke:InfoboxImage|InfoboxImage|image={{#invoke:{{image_size|}}}}|sizedefault=frameless|alt={{alt|}}}}
 | caption = {{{caption|}}}

 | label2 = Organisation
 | data2 = {{#invoke:Wikidata|getValue|P137|{{{organization|}}}}|{{{label2|}}}

 | label3 = Location(s)
 | class3 = label
 | data3 = {{#invoke:Wikidata|getValue|P276|{{{location|FETC|}}|{{{#Property:P17}}}|{{{if:{{{location|}}}}| |, {{#invoke:Wikidata|getV...}}}}|{{{label3|}}}

 | label4 = Coordinates
 | data4 = {{{if:{{{coords|}}}}|{{{coords|}}}}|{{{#if:{{{#Property:P137}}|{{{label4|}}}}|{{{label4|}}}}|{{{#if:{{{#Property:P137}}|{{{label4|}}}}|{{{label4|}}}}}}|{{{label4|}}}

 | label5 = Altitude
 | data5 = {{{#if:{{{#Property:P137}}|{{{label5|}}}}|{{{label5|}}}}|{{{#if:{{{#Property:P137}}|{{{label5|}}}}|{{{label5|}}}}}}|{{{label5|}}}
```



Query service

[Examples](#)[Prefixes ▾](#)[Tools ▾](#)[Help ▾](#)

Wikidata Query Service

Beta

```
1 #Cats
2 SELECT ?item ?itemLabel
3 WHERE
4 {
5     ?item wdt:P31 wd:Q146 .
6     SERVICE wikibase:label { bd:serviceParam wikibase:language "en" }
7 }
```

Press [CTRL-SPACE] to activate auto completion. Data last updated: 10:37:12 AM EDT, Mar 15, 2016

[▶ Execute](#)[Clear](#)

59 Results

in 97 ms

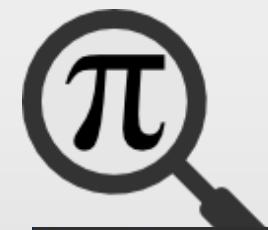
item	itemLabel
wd:Q498787	Muezza
wd:Q677525	Orangey
wd:Q851190	Mrs. Chippy
wd:Q893453	Unsinkable Sam
wd:Q1050083	Catmando
wd:Q1185550	Oscar
wd:Q1201902	Tama



Example Applications

All generated using the data stored in Wikidata

<https://www.wikidata.org/wiki/Wikidata:Tools>



Histropedia

v1.7

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Timeline | About | Contact | How it works



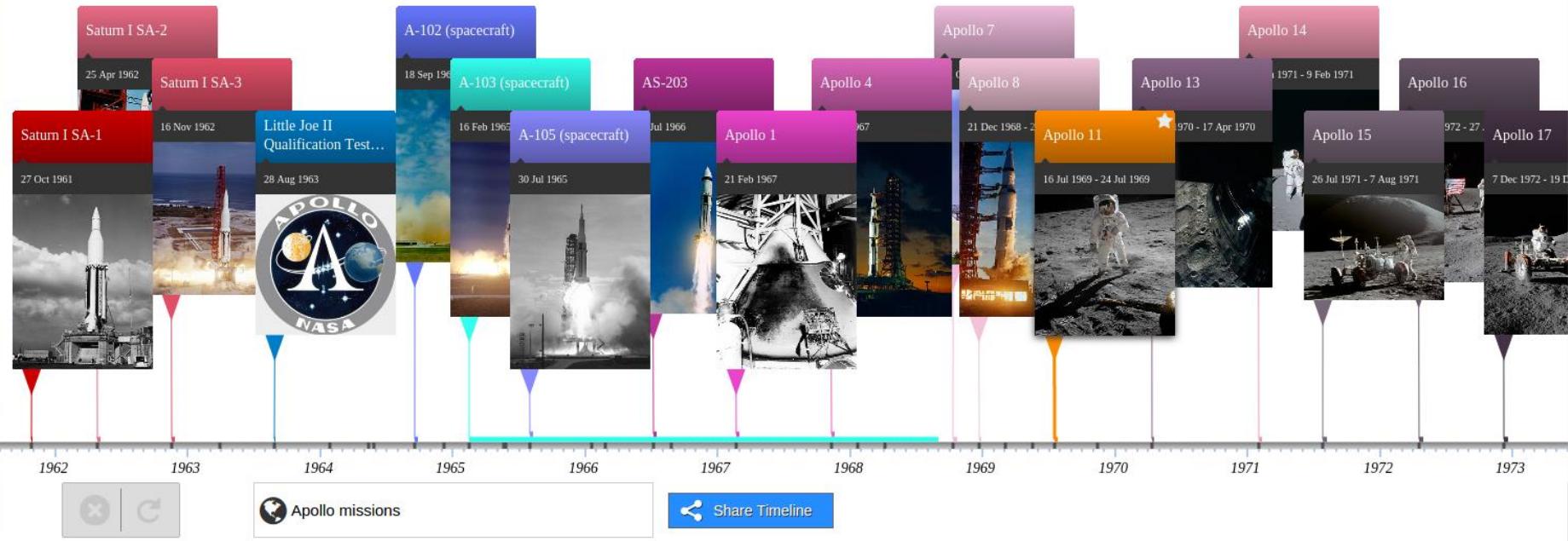
Top 20 Timelines

Start searching for your topic...



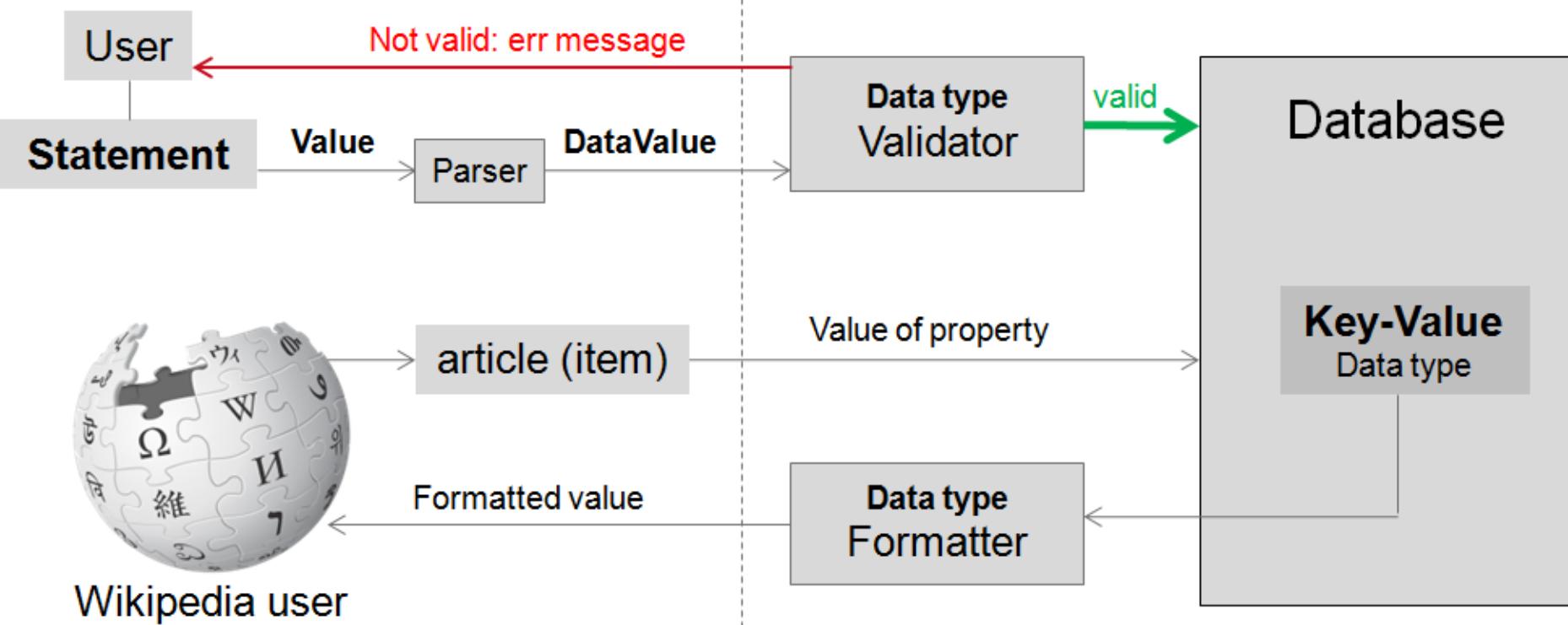
Event Spacing

Compact ▾





Math





Math

- Introduced in Feb 2016
- More than 150 statements until today
- 16/1987 theorems have the defining formula property



wdqs-test.wmflabs.org/#%23Theorems%0ASELECT %3Fitem %3FitemLabel %3Fformula%0A

Wikidata Query Service

```
1 #Theorems
2 SELECT ?item ?itemLabel ?formula
3 WHERE
4 {
5     ?item wdt:P31 wd:Q65943 .
6     ?item wdt:P2534 ?formula .
7     SERVICE wikibase:label { bd:serviceParam wikibase:language "en" }
8 }
```

?

Find instance of theorem

Show defining formula

Limit

Press [CTRL-SPACE] to activate auto completion.

Data updated a few seconds ago

Data last updated: 3s ago.
12:32:04 MESZ, 21. Juli 2016 00 ms

Display ▾ Download ▾ Link ▾

item	itemLabel	formula
wd:Q11518	Pythagorean theorem	$a^2 + b^2 = c^2$
wd:Q26708	binomial theorem	$(x+y)^n = \binom{n}{0}x^n y^0 + \binom{n}{1}x^{n-1}y^1 + \binom{n}{2}x^{n-2}y^2 + \dots + \binom{n}{n-1}x^1y^{n-1} + \binom{n}{n}x^0y^n$
wd:Q170181	law of sines	$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$

TeX string

 $E=mc^2$

▼ 0 references

[edit](#)[+ add reference](#)[+ add](#)

defining formula

 $E = mc^2$

▼ 0 references

[edit](#)[+ add reference](#)[+ add](#)

has part

energy

defining formula

 E

▼ 0 references

[edit](#)[+ add reference](#)

speed of light

defining formula

 c

▼ 0 references

[edit](#)[+ add reference](#)

mass

defining formula

 m

▼ 0 references

[edit](#)[+ add reference](#)



Get involved

- [https://www.wikidata.org/wiki/Wikidata:
WikiProject Mathematics](https://www.wikidata.org/wiki/Wikidata:WikiProject_Mathematics)
- Open questions:
 - Import and exports formats
 - Content MathML
 - RDF and MathML
 - User interfaces
 - Consistency