

# E

E

[illegible]

?E?, or ?e?, is the fifth letter and the second vowel letter of the Latin alphabet, used in the modern English alphabet, the alphabets of other western European languages and others worldwide. Its name in English is e (pronounced ); plural es, Es, or E's.

It is the most commonly used letter in many languages, including Czech, Danish, Dutch, English, French, German, Hungarian, Latin, Latvian, Norwegian, Spanish, and Swedish.

## Exponential function

into real and imaginary parts:  $e^{x+iy} = e^x e^{iy} = e^x \cos y + i e^x \sin y$ .  $\{e^{x+iy} = e^x \{e^{iy} = \cos y + i \sin y\}$

In mathematics, the exponential function is the unique real function which maps zero to one and has a derivative everywhere equal to its value. The exponential of a variable ?

X

$$\{\displaystyle x\}$$

? is denoted ?

exp

?

X

$$\{\displaystyle \exp x\}$$

? or ?

e

X

$$e^x$$

?, with the two notations used interchangeably. It is called exponential because its argument can be seen as an exponent to which a constant number  $e \approx 2.718$ , the base, is raised. There are several other definitions of the exponential function, which are all equivalent although being of very different nature.

The exponential function converts sums to products: it maps the additive identity 0 to the multiplicative identity 1, and the exponential of a sum is equal to the product of separate exponentials, ?

exp

?

(

x

+

y

)

=

exp

?

x

?

exp

?

y

$$\exp(x+y) = \exp x \cdot \exp y$$

?. Its inverse function, the natural logarithm, ?

ln

$$\ln$$

? or ?

log

$$\log$$

?, converts products to sums: ?

ln

?

(

x

?

y

)

=

$\ln$

?

$x$

+

$\ln$

?

$y$

$$\{\displaystyle \ln(x\cdot y)=\ln x+\ln y\}$$

?.

The exponential function is occasionally called the natural exponential function, matching the name natural logarithm, for distinguishing it from some other functions that are also commonly called exponential functions. These functions include the functions of the form ?

$f$

(

$x$

)

=

$b$

$x$

$$\{\displaystyle f(x)=b^{\{x\}}\}$$

?, which is exponentiation with a fixed base ?

$b$

$$\{\displaystyle b\}$$

?. More generally, and especially in applications, functions of the general form ?

$f$

(

$x$

)

=

a

b

x

$$f(x) = ab^x$$

are also called exponential functions. They grow or decay exponentially in that the rate that

f

(

x

)

$$f(x)$$

changes when

x

$$x$$

is increased is proportional to the current value of

f

(

x

)

$$f(x)$$

?

The exponential function can be generalized to accept complex numbers as arguments. This reveals relations between multiplication of complex numbers, rotations in the complex plane, and trigonometry. Euler's formula

exp

?

i

?

=

cos

?

?

+

i

sin

?

?

$$\{\displaystyle \exp i\theta =\cos \theta +i\sin \theta \}$$

? expresses and summarizes these relations.

The exponential function can be even further generalized to accept other types of arguments, such as matrices and elements of Lie algebras.

E (mathematical constant)

*The number e is a mathematical constant approximately equal to 2.71828 that is the base of the natural logarithm and exponential function. It is sometimes*

The number e is a mathematical constant approximately equal to 2.71828 that is the base of the natural logarithm and exponential function. It is sometimes called Euler's number, after the Swiss mathematician Leonhard Euler, though this can invite confusion with Euler numbers, or with Euler's constant, a different constant typically denoted

?

$$\{\displaystyle \gamma \}$$

. Alternatively, e can be called Napier's constant after John Napier. The Swiss mathematician Jacob Bernoulli discovered the constant while studying compound interest.

The number e is of great importance in mathematics, alongside 0, 1, ?, and i. All five appear in one formulation of Euler's identity

e

i

?

+

1

=

0

and play important and recurring roles across mathematics. Like the constant  $\pi$ ,  $e$  is irrational, meaning that it cannot be represented as a ratio of integers, and moreover it is transcendental, meaning that it is not a root of any non-zero polynomial with rational coefficients. To 30 decimal places, the value of  $e$  is:

*superscripted letters and symbols: Latin/IPA* ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ? ?  
? ? ? ? ? ? ? ? ? , *Greek* ? ? ? ? ? , *Cyrillic*

Unicode has subscripted and superscripted versions of a number of characters including a full set of Arabic numerals. These characters allow any polynomial, chemical and certain other equations to be represented in plain text without using any form of markup like HTML or TeX.

The World Wide Web Consortium and the Unicode Consortium have made recommendations on the choice between using markup and using superscript and subscript characters:

When used in mathematical context (MathML) it is recommended to consistently use style markup for superscripts and subscripts [...] However, when super and sub-scripts are to reflect semantic distinctions, it is easier to work with these meanings encoded in text rather than markup, for example, in phonetic or phonemic transcription.

while accents (â, â, ê, î, ô, û) together with digraphs (ah, eh etc.) are used for long vowels (??, ??, ??, ??, ??). Stroked

Fraktur (German: [fʁakˈtuʁ] ) is a calligraphic hand of the Latin alphabet and any of several blackletter typefaces derived from this hand. It is designed such that the beginnings and ends of the individual strokes that make up each letter will be clearly visible, and often emphasized; in this way it is often contrasted with the curves of the Antiqua (common) typefaces where the letters are designed to flow and strokes connect together in a continuous fashion. The word "Fraktur" derives from Latin *fractura* ("a break"), built from *fractus*, passive participle of *frangere* ("to break"), which is also the root for the English word "fracture". In non-professional contexts, the term "Fraktur" is sometimes misused to refer to all blackletter typefaces – while Fraktur typefaces do fall under that category, not all blackletter typefaces exhibit the Fraktur characteristics described above.

Fraktur is often characterized as "the German typeface", as it remained popular in Germany and much of Eastern Europe far longer than elsewhere. Beginning in the 19th century, the use of Fraktur versus Antiqua (seen as modern) was the subject of controversy in Germany. The Antiqua–Fraktur dispute continued until 1941, when the Nazi government banned Fraktur typefaces. After Nazi Germany fell in 1945, Fraktur was unbanned, but it failed to regain widespread popularity.

electromotive force (also electromotance, abbreviated *emf*, denoted  $\mathcal{E}$ ) is an energy transfer to an electric circuit per unit of

$$\{\mathrm{E}\}$$

) is an energy transfer to an electric circuit per unit of electric charge, measured in volts. Devices called electrical transducers provide an emf by converting other forms of energy into electrical energy. Other types of electrical equipment also produce an emf, such as batteries, which convert chemical energy, and generators, which convert mechanical energy. This energy conversion is achieved by physical forces applying physical work on electric charges. However, electromotive force itself is not a physical force, and ISO/IEC standards have deprecated the term in favor of source voltage or source tension instead (denoted

U

s

$\{\displaystyle U_{\mathrm{s}}\}$

).

An electronic–hydraulic analogy may view emf as the mechanical work done to water by a pump, which results in a pressure difference (analogous to voltage).

In electromagnetic induction, emf can be defined around a closed loop of a conductor as the electromagnetic work that would be done on an elementary electric charge (such as an electron) if it travels once around the loop.

For two-terminal devices modeled as a Thévenin equivalent circuit, an equivalent emf can be measured as the open-circuit voltage between the two terminals. This emf can drive an electric current if an external circuit is attached to the terminals, in which case the device becomes the voltage source of that circuit.

Although an emf gives rise to a voltage and can be measured as a voltage and may sometimes informally be called a "voltage", they are not the same phenomenon (see § Distinction with potential difference).

Blackboard bold

*blackboard bold typeface for uppercase Latin letters accessed using `\mathbb` (e.g. `\mathbb{R}` produces  $\{\displaystyle \mathbb{R}\}$ ). In Unicode, a few*

Blackboard bold is a style of writing bold symbols on a blackboard by doubling certain strokes, commonly used in mathematical lectures, and the derived style of typeface used in printed mathematical texts. The style is most commonly used to represent the number sets

N

$\{\displaystyle \mathbb{N}\}$

(natural numbers),

Z

$\{\displaystyle \mathbb{Z}\}$

(integers),

Q

$\{\displaystyle \mathbb{Q}\}$

(rational numbers),

R

$\mathbb{R}$

(real numbers), and

C

$\mathbb{C}$

(complex numbers).

To imitate a bold typeface on a typewriter, a character can be typed over itself (called double-striking); symbols thus produced are called double-struck, and this name is sometimes adopted for blackboard bold symbols, for instance in Unicode glyph names.

In typography, a typeface with characters that are not solid is called inline, handtooled, or open face.

## Enclosed Alphanumeric Supplement

*Official Unicode Consortium code chart (PDF)* 0 1 2 3 4 5 6 7 8 9 A B C D E F U+1F10x ? ? ? ? ? ? ? ?  
? ? ? ? ? ? U+1F11x ? ? ?

Enclosed Alphanumeric Supplement is a Unicode block consisting of Latin alphabet characters and Arabic numerals enclosed in circles, ovals or boxes, used for a variety of purposes. It is encoded in the range U+1F100–U+1F1FF in the Supplementary Multilingual Plane.

The block is mostly an extension of the Enclosed Alphanumerics block, containing further enclosed alphanumeric characters which are not included in that block or Enclosed CJK Letters and Months. Most of the characters are single alphanumerics in boxes or circles, or with trailing commas. Two of the symbols are identified as dingbats. A number of multiple-letter enclosed abbreviations are also included, mostly to provide compatibility with Broadcast Markup Language standards (see ARIB STD B24 character set) and Japanese telecommunications networks' emoji sets. The block also includes the regional indicator symbols to be used for emoji country flag support.

E!

*E! Entertainment Television is an American basic cable television network. It is owned by the NBCUniversal Media Group division of Comcast's NBCUniversal*

E! Entertainment Television is an American basic cable television network. It is owned by the NBCUniversal Media Group division of Comcast's NBCUniversal. The channel focuses primarily on pop culture, celebrity-based reality shows and movies.

As of November 2023, E! is available to approximately 71 million pay television households in the United States—down from its 2011 peak of 99 million households.

## Enclosed Alphanumerics

? ? ? ? ? ? U+24Bx ? ? ? ? ? ? ? ? ? ? ? ? U+24Cx ? ? ? ? ? ? ? ? ? ? ? ? ? ? U+24Dx ? ? ? ?  
? ? ? ? ? ? ? ? ? ? ? ? U+24Ex ? ? ? ? ? ?

Enclosed Alphanumerics is a Unicode block of typographical symbols of an alphanumeric within a circle, a bracket or other not-closed enclosure, or ending in a full stop.

It is currently fully allocated. Within the Basic Multilingual Plane, a few additional enclosed numerals are in the Dingbats and the Enclosed CJK Letters and Months blocks. There is also a block with more of these characters in the Supplementary Multilingual Plane named Enclosed Alphanumeric Supplement (U+1F100–U+1F1FF), as of Unicode 6.0.

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