NUMERICAL EXPRESSIONS

The following section will give you help in the reading, speaking and writing of numbers and expressions which commonly contain numbers.

Numbers

CARDINAL	ORDINAL
1 one / wʌn /	1st first / fɜːst /
2 two / tuː /	2nd second / 'sekənd /
3 three / θriː /	3rd third / θɜːd /
4 four / fɔː(r) /	4th fourth / fɔːθ /
5 five / faɪv /	5th fifth / fɪfθ /
6 six / sɪks /	6th sixth / sɪksθ /
7 seven / 'sevn /	7th seventh / 'sevənθ /
8 eight / eɪt /	8th eighth / eɪtθ /
9 nine / naɪn /	9th ninth / naɪnθ /
10 ten / ten /	10th tenth / tenθ /
11 eleven / ɪ'levn /	11th eleventh / ɪ'levnθ /
12 twelve / twelv /	12th twelfth / twelfθ /
13 thirteen / ˌθɜː'tiːn /	13th thirteenth / ˌθɜː'tiːnθ /
14 fourteen / ˌfɔː'tiːn /	14th fourteenth / ˌfɔː'tiːnθ /
15 fifteen / ˌfɪf'tiːn /	15th fifteenth / ˌfɪf'tiːnθ /
16 sixteen / ˌsɪk'stiːn /	16th sixteenth / ˌsɪk'stiːnθ /
17 seventeen / ˌsevn'tiːn /	17th seventeenth / ˌsevn'tiːnθ /
18 eighteen / ˌeɪ'tiːn /	18th eighteenth / ˌeɪ'tiːnθ /
19 nineteen / ˌnaɪn'tiːn /	19th nineteenth / ˌnaɪn'tiːnθ /
20 twenty / 'twentɪ /	20th twentieth / 'twentɪəθ /
21 twenty-one / ˌtwentɪ'wʌn /	21st twenty-first / ˌtwentɪ'fɜːst /
22 twenty-two / ˌtwentɪ'tuː /	22nd twenty-second / ˌtwentɪ'sekənd /
23 twenty-three / ˌtwentɪ'θriː /	23rd twenty-third / ˌtwentɪ'θɜːd /
30 thirty / 'θɜːtɪ /	30th thirtieth / 'θɜːtɪəθ /
40 forty / 'fɔːtɪ /	40th fortieth / 'fɔːtɪəθ /
50 fifty / 'fɪftɪ /	50th fiftieth / 'fɪftɪəθ /
60 sixty / 'sɪkstɪ /	60th sixtieth / 'sɪkstɪəθ /
70 seventy / 'sevntɪ /	70th seventieth / 'sevntɪəθ /
80 eighty / 'eɪtɪ /	80th eightieth / 'eɪtɪəθ /
90 ninety / 'naɪntɪ /	90th ninetieth / 'naɪntɪəθ /
100 one hundred / wʌn 'hʌndrəd /	100th one hundredth / wʌn 'hʌndrədθ /
200 two hundred / ˌtuː 'hʌndrəd /	200th two hundredth / ˌtuː 'hʌndrədθ /
1 000 one thousand / wʌn 'θaʊznd /	1 000th one thousandth / wʌn 'θaʊznθ /
10 000 ten thousand / ˌten 'θaʊznd /	10 000th ten thousandth / ˌten 'θaʊznθ /
100 000 one hundred thousand / wʌn ˌhʌndrəd 'θaʊznd /	100 000 one hundred thousandth / wʌn ˌhʌndrəd 'θaʊznθ /
1 000 000 one million / wʌn 'mɪlɪən /	1 000 000th one millionth / wʌn 'mɪlɪənθ /

1 000 000 000 one thousand million(s) / wʌn ˌθaʊznd 'mɪlɪən(z) / (US) one billion / wʌn 'bɪlɪən /
1 000 000 000 000 one billion / wʌn 'bɪlɪən / (US) one trillion / wʌn 'trɪlɪən /
1 000 000 000 000 000 one thousand billion(s) / wʌn ˌθaʊznd 'bɪlɪən(z) / (US) one quadrillion / wʌn kwɒ'drɪlɪən /
1 000 000 000 000 000 000 one trillion / wʌn 'trɪlɪən / (US) one quintillion / wʌn kwɪn'tɪlɪən /

EXAMPLES OF MORE COMPLEX NUMBERS
101 one hundred and one / wʌn ˌhʌndrəd n 'wʌn /
101st one hundred and first / wʌn ˌhʌndrəd n 'fɜːst /
334 three hundred and thirty-four / ˌθriː ˌhʌndrəd n ˌθɜːtɪ 'fɔː(r) /
542nd five hundred and forty-second / faɪv ˌhʌndrəd n ˌfɔːtɪ 'sekənd /
1 101 one thousand, one hundred and one / wʌn 'θaʊznd ˌwʌn 'hʌndrəd n 'wʌn /
1 234 753 one million, two hundred and thirty-four thousand, seven hundred and fifty-three
/ wʌn 'mɪlɪən ˌtuː ˌhʌndrəd n ˌθɜːtɪ fɔː 'θaʊznd ˌsevn ˌhʌndrəd n fɪftɪ 'θriː /

NUMERICAL EXPRESSIONS

VULGAR FRACTIONS

⅛ an/one eighth / ən, wʌn 'eɪtθ /

¼ a/one quarter / ə, wʌn 'kwɔːtə(r) /
⅓ a/one third / ə, wʌn 'θɜːd /

½ a/one half / ə, wʌn 'hɑːf; US: 'hæf /
¾ three quarters / ˌθriː 'kwɔːtəz /

5½ five and a half / ˌfaɪv ən ə 'hɑːf; US 'hæf /
13¾ thirteen and three quarters / ˌθɜːtiːn ən θriː 'kwɔːtəz /

DECIMAL FRACTIONS

0.125 (nought) point one two five / (ˌnɔːt) pɔɪnt ˌwʌn tuː 'faɪv /
0.25 (nought) point two five / (ˌnɔːt) pɔɪnt ˌtuː 'faɪv /
0.33 (nought) point three three / (nɔːt) pɔɪnt θriː 'θriː /
0.5 (nought) point five / (nɔːt) pɔɪnt faɪv /
0.75 (nought) point seven five / (ˌnɔːt) pɔɪnt ˌsevn 'faɪv /
5.5 five point five / ˌfaɪv pɔɪnt 'faɪv /
13.75 thirteen point seven five / ˌθɜːtiːn pɔɪnt ˌsevn 'faɪv /

COLLECTIVE NUMBERS

6	a half dozen/half a dozen
12	a/one dozen (24 is two *dozen* not two *dozens*)
20	a/one score
144	a/one gross / grəʊs /

ROMAN		ARABIC	ROMAN		ARABIC	ROMAN	ARABIC	ROMAN	ARABIC
I	i	1	XIV	xiv	14	LX	60	CM	900
II	ii	2	XV	xv	15	LXX	70	M	1000
III	iii	3	XVI	xvi	16	LXXX	80	MC	1100
IV	iv	4	XVII	xvii	17	XC	90	MCD	1400
V	v	5	XVIII	xviii	18	IC	99	MDC	1600
VI	vi	6	XIX	xix	19	C	100	MDCLXVI	1666
VII	vii	7	XX	xx	20	CC	200	MDCCLXXXVIII	1788
VIII	viii	8	XXI	xxi	21	CCC	300	MDCCCXCIV	1894
IX	ix	9	XXV	xxv	25	CD	400	MCM	1900
X	x	10	XXIX	xxix	29	D	500	MCMLXXVI	1976
XI	xi	11	XXX	xxx	30	DC	600	MCMLXXXIX	1989
XII	xii	12	XL	xl	40	DCC	700	MM	2000
XIII	xiii	13	L	l	50	DCCC	800		

A letter placed after another letter of greater value adds, eg VI = 5 + 1 = 6. A letter placed before a letter of greater value subtracts, eg IV = 5 − 1 = 4. A dash placed over a letter multiplies the value by 1 000; thus $\overline{X}$ = 10 000 and $\overline{M}$ = 1 000 000.

Notes:

1 In large numbers starting with 'one' the indefinite article may be substituted in less formal use or when the number is not intended to be exact: *He's got over a thousand records.*

2 When saying ordinary numbers we can use 'zero', 'nought' or 'o' / əʊ / for the number 0; 'zero' is the most common US usage and the most technical or precise form, 'o' is the least technical or precise. ⇨ Usage at NOUGHT.

3 A comma is sometimes used instead of a space to separate the thousands in numbers greater than 9 999: 10 000 / 10,000; 7 586 954 / 7,586,954.

4 Thousands may be spoken as hundreds, especially in informal use: *eleven hundred* (ie 1 100).

5 Long numbers (eg bank accounts, credit card numbers, etc) are spoken as separate digits grouped rhythmically in twos or threes:

o five four / eight six three / nine double six (ie 054863966).

6 Names for numbers above *trillion* are rarely used. When larger numbers need to be expressed, eg in astronomy, this is usually done in terms of powers of ten, ie the number of zeros following the 10:

ten to the power fifteen / to the fifteenth (power) (ie 10 000 000 000 000 000).

7 In the spoken forms of vulgar fractions, the versions 'and a half/quarter/third' are preferred to 'and one half/quarter/third' whether the measurement is approximate or precise. With more obviously precise fractions like $\frac{1}{8}$, $\frac{1}{16}$, 'and one eighth/sixteenth' is normal. Complex fractions like $\frac{3}{462}$, $\frac{20}{83}$ are spoken as 'three over four-six-two; twenty over eighty-three', especially in mathematical expressions, eg 'twenty-two over seven' for $\frac{22}{7}$.

8 A point is used in writing decimal fractions (rather than a comma, as in continental Europe). The digits after the point are read by saying 'point' and then each digit separately:

two hundred and seventy-three point two nine six (ie 273.296). In decimal fractions less than one, the 'nought' (or 'zero') before the decimal point may be omitted: *point seven five* (ie 0.75).

Mathematical Expressions

Where alternative ways of saying the expressions are given,
the first is generally more formal or technical.

+	plus / and
−	minus / take away
±	plus or minus
×	(is) multiplied by / times (*or when giving dimensions by*)
÷	(is) divided by
=	is equal to / equals
≠	is not equal to / does not equal
≃	is approximately equal to
≡	is equivalent to / is identical with
<	is less than
≮	is not less than
≤	is less than or equal to
>	is more than
≯	is not more than
≥	is more than or equal to
%	per cent

∞	infinity
∝	varies as / is proportional to
3:9::4:12	three is to nine as four is to twelve
$\log_e$	natural logarithm *or* logarithm to the base e / iː /
√	(square) root
$\sqrt[3]{}$	cube root
x^2	x / eks / squared
x^3	x / eks / cubed
x^4	x / eks / to the power of four / to the fourth
p	pi / paɪ /
r	/ ɑː(r) / = radius of a circle
∫	the integral of
°	degree
′	minute (of an arc); foot *or* feet (unit of length)
″	second (of an arc); inch *or* inches (unit of length)

Numbers in Measurements

A: LINEAR MEASUREMENT

symb	abbr	full word	abbr	full word
″	in	inch(es)	mm	millimetre
′	ft	foot/feet	cm	centimetre
	yd	yard	m	metre
	ml	mile	km	kilometre

Typical measurements

(i) Building
a piece of wood ⅛″ thick
a piece of glass 7 mm thick

(ii) Rainfall
1½″ of rain in 24 hours
less than 600 mm of rain a year

(iii) Vital statistics
She's 36-24-38 (ie the circumference of her bust,
waist and hips is 36, 24 and 38 inches respectively).

(iv) Clothing
He takes a 16½ collar (ie his neck is 16½ inches in
circumference).

(v) Height of people
She's about 5 ft 6 in (tall).
The average height of the tribe is less than 1 m 20 cm.
Note: When referring to people, '*tall*' is used, not
'*high*', and measurements are given in feet and
inches (but *not* yards) or metres and centimetres.

(vi) Height of objects
Maximum headroom 7′ 2¼″ or 2.2 m (ie passage is
limited to vehicles less than this height).
Ben Nevis is 4 406 ft high.
The road rises to 2 288 m above sea-level.

(vii) Dimensions
a baking dish measuring 9″ × 8″
A4 paper is 297 × 210 mm.
a room 16 feet (wide) by 25 feet (long)

(viii) Distance
about 100 yds down the road
a bridge 695 metres long
New York is 22 915 miles from Los Angeles by road.
The Amazon is more than 6 450 km long.

(ix) Speed
a speed limit of 30 mph
Sound travels at 331.7 metres per second.
Light travels 186 300 miles in a second.

B: AREA MEASUREMENT

abbr	full word	symb	abbr	full word
sq in	square inch(es)	mm²	sq mm	square millimetre
sq ft	square foot/feet	cm²	sq cm	square centimetre
sq yd	square yard	m²	sq m	square metre
sq ml	square mile	km²	sq km	square kilometre
	acre		ha	hectare

Typical measurements

We require 5 000 sq ft of office space.
Light industrial lot (600 m²) for lease.
Dartmoor covers an area of more than 350 square
miles in SW England

Greater London is an administrative area of
1 610 sq kms.
a house for sale with 10 acres of grounds
more than 500 hectares of orchard

C: VOLUME MEASUREMENT

abbr	full word	symb	full word
cu in	cubic inch(es)	mm^3	cubic millimetre
cu ft	cubic foot/feet	cc, cm^3	cubic centimetre
cu yd	cubic yard	m^3	cubic metre

Typical measurements

a 1300cc engine (ie the total capacity of the cylinders is 1 300 cubic centimetres)

You'll need 30 cubic feet of sand to mix with the cement.
a tunnelling machine capable of removing 400 m^3 of earth an hour

D: LIQUID MEASUREMENT

abbr	full name	abbr	full name
fl oz	fluid ounce	ml	millilitre
pt	pint	cl	centilitre
qt	quart	l	litre
gall	gallon		

Typical measurements

Add 8fl oz stock and bring to the boil.
The standard wine bottle contains 75cl.
Three pints of bitter and half (a pint) of lager, please.

You'll need about five litres of paint for this room.
a car averaging 33 miles per gallon (ie that requires approximately 1 gallon of petrol to drive 33 miles)

E: WEIGHT MEASUREMENT

abbr	full name	abbr	full name
oz	ounce	g (gms)	grams
lb	pound	k(g)	kilo(gram)
st	stone		metric ton (tonne)
	quarter		
cwt	hundredweight		
	ton		

Typical measurements

Add 4oz (100gms) finely chopped ham.
Four pounds of potatoes and a pound of carrots, please.
(Brit) My brother weighs 12 stone eleven (pounds).
(US) My brother weighs 183 pounds.
Note: People's weight is usually measured in

stones and pounds in Britain and in pounds only in the US.
Maximum baggage allowance: 32 kg
half a hundredweight of gravel
a 10 ton lorry (ie a lorry that can carry a maximum load of ten tons)

Measurement of Temperature

Temperatures in Britain were traditionally measured by the Fahrenheit scale (°F). Although the Celsius or centigrade system (°C) is now officially in use, many people continue to refer informally to degrees Fahrenheit. The Fahrenheit scale is still used in the US for non-scientific purposes.

The temperature will fall to minus five tonight. (−5°C)
They say we're going to have nine degrees of frost tonight. (23°F)
It must be ninety-five this afternoon. (95°F)
The normal temperature of the human body is 37°C.
She's ill in bed with a temperature of a hundred and two. (102°F)

Numbers in Measuring Time

[handwritten:] a.m. = ante meridiem ↳ BEFORE midday, p.m. = post meridiem ↳ AFTER midday

A: AGE

He's 33 (years old).
The suspect is believed to be aged about twenty-seven.
a man in his thirties (ie between 30 and 39 years old)
He looks fortyish (ie about 40 years old).
She's in her early/middle/late teens (ie 13–15/15–17/17–19 years old).
'How old's your youngest child?'
'She's one year and three months/fifteen months (old).'
a two-week-old baby

B: TIME OF DAY

The twelve hour system is most widely used:

7.00	seven o'clock; seven am/pm
8.15	eight fifteen; a quarter past eight (US also a quarter after eight)
9.45	nine forty-five; a quarter to ten (US also a quarter of ten)
4.30	four thirty; (esp Brit) half past four; (infml) half four
5.10	five ten; ten (minutes) past five; (US also ten after five)
6.35	six thirty-five; twenty-five (minutes) to seven
8.03	eight o three; three minutes past eight
9.55	nine fifty-five; five (minutes) to ten; (US also five of ten)