

## Description

`mindouble()` returns the largest negative, nonmissing value.

`maxdouble()` returns the largest positive, nonmissing value.

`smallestdouble()` returns the smallest full-precision value of  $e$ ,  $e > 0$ . The largest full-precision value of  $e$ ,  $e < 0$  is `-smallestdouble()`.

## Syntax

*real scalar* `mindouble()`

*real scalar* `maxdouble()`

*real scalar* `smallestdouble()`

## Remarks and examples

All nonmissing values  $x$  fulfill `mindouble() ≤ x ≤ maxdouble()`.

All missing values  $m$  fulfill  $m > \text{maxdouble}()$

Missing values also fulfill  $m ≥ .$

On all computers on which Stata and Mata are currently implemented, which are computers following IEEE standards:

Function	Exact hexadecimal value	Approximate decimal value
<code>mindouble()</code>	<code>-1.fffffffffffffX+3ff</code>	<code>-1.7977e+308</code>
<code>smallestdouble()</code>	<code>+1.000000000000000X-3fe</code>	<code>2.2251e-308</code>
<code>epsilon(1)</code>	<code>+1.000000000000000X-034</code>	<code>2.2205e-016</code>
<code>maxdouble()</code>	<code>+1.fffffffffffffX+3fe</code>	<code>8.9885e+307</code>

The smallest missing value (`. < .a < ... < .z`) is `+1.000000000000000X+3ff`.

Do not confuse `smallestdouble()` with the more interesting value `epsilon(1)`. `smallestdouble()` is the smallest full-precision value of  $e$ ,  $e > 0$ . `epsilon(1)` is the smallest value of  $e$ ,  $e+1 > 1$ ; see [M-5] `epsilon()`.

## Conformability

`mindouble()`, `maxdouble()`, `smallestdouble()`:  
*result*:       $1 \times 1$

## Diagnostics

None.

## Reference

Linhart, J. M. 2008. Mata Matters: Overflow, underflow and the IEEE floating-point format. *Stata Journal* 8: 255–268.

## Also see

[M-5] `epsilon()` — Unit roundoff error (machine precision)

[M-4] `Utility` — Matrix utility functions

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