**mindouble( )** — Minimum and maximum nonmissing value



## 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()` $\leq x \leq$ `maxdouble()`.

All missing values $m$ fulfill $m >$ `maxdouble()`

Missing values also fulfill $m \geq$ `.`

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

| Function | Exact hexadecimal value | Approximate decimal value |
|---|---|---|
| `mindouble()` | `-1.fffffffffffffX+3ff` | −1.7977e+308 |
| `smallestdouble()` | `+1.0000000000000X-3fe` | 2.2251e–308 |
| `epsilon(1)` | `+1.0000000000000X-034` | 2.2205e–016 |
| `maxdouble()` | `+1.fffffffffffffX+3fe` | 8.9885e+307 |

The smallest missing value (`.` < `.a` < ··· < `.z`) is `+1.0000000000000X+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