Data Science Math Skills
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Numbers: Greater-than and Less-than

Video companion

1 Inequalities, basic idea

Introduction to symbols:

$a < b$	"a is less than b"
$x > y$	"x is greater than y"
$c \leq d$	"c is less than or equal to d"
$z \geq w$	"z is greater than or equal to w"
$e \ll f$	"e is much, much less than f"

2 Inequality on the real number line

$2 < 3.1$	"2 is to the left of 3.1 on the real number line"
$-11.78 < 3.1$	"-11.78 is to the left of 3.1 on the real number line"

For any $a < b$, a must be to the left of b on the real number line.

$3.1 > 2$	"3.1 is to the right of 2 on the real number line"

In general, a is less than b, if, and only if, b is greater than a:

$$\boxed{a < b \iff b > a}$$

3 Much, much less than

$x \ll y$ "x is much, much less than y"
(Not proper math, but used frequently in data science)

For example, $1 \ll 1,000,000$, which is reasonable but not possible to prove "true"

4 Less than or equal to

$a \leq b$ means $a < b$ or $a = b$

Examples:

Is $2 \leq 3.1$ true?

$$\left.\begin{array}{ll} 2 < 3.1 & \checkmark \\ 2 = 3.1 & \times \end{array}\right] \checkmark$$

Is $2 \leq 2$ true?

$$\left.\begin{array}{ll} 2 < 2 & \times \\ 2 = 2 & \checkmark \end{array}\right] \checkmark$$

Is $2 \leq 0.8$ true?

$$\left.\begin{array}{ll} 2 < 0.8 & \times \\ 2 = 0.8 & \times \end{array}\right] \times$$