

Precalculus

Interval notation, the \in and the \cup symbols

Todor Milev

2019

Outline

1 Interval notation

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- 2 Inequalities and interval notation

Review of standard interval notation

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 - the open/closed/semi-closed interval notation;
 - the “belongs to” \in sign;
 - the **union** \cup sign.

Let $a < b$ be two real numbers.

Definition (Interval notation)



The set (interval) of all real numbers from a to b is denoted as follows.

| Notation | Endpoints | Picture |
|----------|-----------|---------|
| $[a, b]$ | | |
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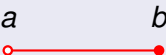
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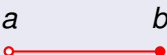
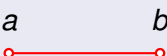
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| (a, b) | including neither a nor b |  or (---) |

Let a be a number.

Definition (Infinite intervals)

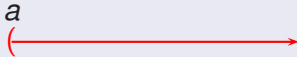
The set of all numbers greater than/smaller than a is denoted with the help of the ∞ symbol.

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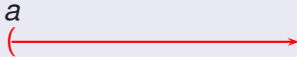
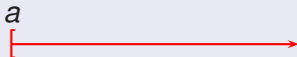
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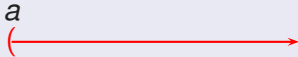
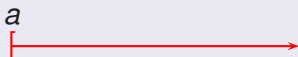
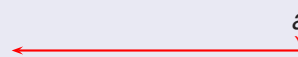
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Write the set of numbers x satisfying $0 \leq x \leq 2$ in interval notation.

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Write the set of numbers x satisfying $-1 \leq x < 1$ in interval notation.

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Write the set of numbers x satisfying $x < 2$ in interval notation.

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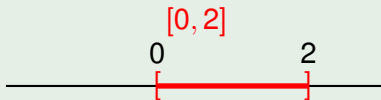
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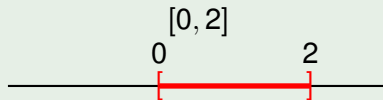
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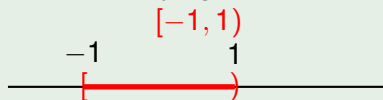
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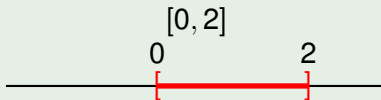


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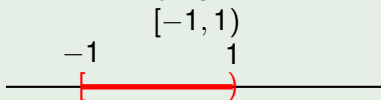
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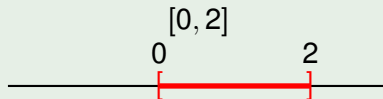
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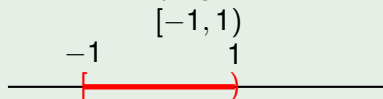
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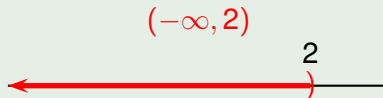
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- The union of A and B is the set consisting of the elements in A and the elements in B , without additional elements.
- The union of A and B is denoted by

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Plot the points in the set $[-1, 2) \cup (1, 3]$.

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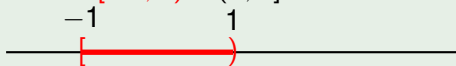
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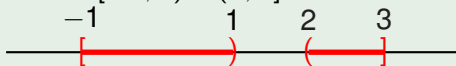
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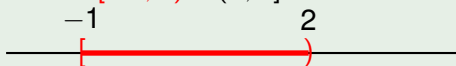
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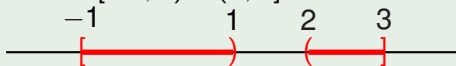
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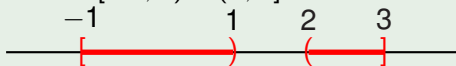
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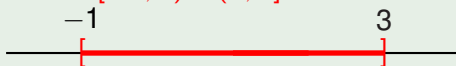
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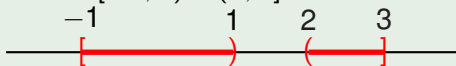
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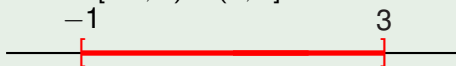
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- To draw the points of a union draw both on top of one another.

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