



## Why

We want to order the integers.

## Definition

Consider  $[(a, b)], [(b, c)] \in \mathbf{Z}$ . If  $a + d < b + c$ , then we say that  $[(a, b)]$  is *less than*  $[(b, c)]$ .<sup>1</sup> If  $[(a, b)]$  is less than  $[(b, c)]$  or equal, then we say that  $[(a, b)]$  is *less than or equal to*  $[(b, c)]$ .

## Notation

If  $x, y \in \mathbf{Z}$  and  $x$  is less than  $y$ , then we write  $x < y$ . If  $x$  is less than or equal to  $y$ , we write  $x \leq y$ .

## Positive and negative integers

We call an integer  $z$  *positive* if  $z > 0$  and we call  $z$  *negative* if  $z < 0$ .<sup>2</sup> We call an integer  $z$  *nonnegative* if  $z > 0$  or  $z = 0$  and *nonpositive* if  $z < 0$  or  $z = 0$ .

## Notation

We denote the set  $\{z \in \mathbf{Z} \mid z \geq 0\}$  by  $\mathbf{Z}_{++}$ .

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<sup>1</sup>One needs to show that this is well-defined. The account will appear in future editions.

<sup>2</sup>Some authors use the term positive for the case when  $z > 0$  or  $z = 0$ . We use the term nonnegative in this case.



