

LaTeX Example

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Theorem 1. *The sum of two even integers is an even integer.*

Proof. Let m and n be any two even integers, which means $m = 2j$ and $n = 2k$ for some integers j and k . Now,

$$\begin{aligned}m + n &= 2j + 2k \\ &= 2(j + k).\end{aligned}$$

Since the integers are closed under addition, $j + k$ is an integer, and so we have written $m + n$ as twice some integer. Therefore, $m + n$ is even, as desired. \square

Theorem 2. *The sum of any two rational numbers is rational.*

Proof. Let $r, s \in \mathbb{Q}$, which means $r = \frac{a}{b}$ and $s = \frac{c}{d}$, where $a, b, c, d \in \mathbb{Z}$ and $b, d \neq 0$.

Now,

$$\begin{aligned}r + s &= \frac{a}{b} + \frac{c}{d} \\ &= \frac{ad}{bd} + \frac{bc}{bd} \\ &= \frac{ad + bc}{bd}.\end{aligned}$$

By properties of integer addition and multiplication, we know $ad + bc, bd \in \mathbb{Z}$. We know also $bd \neq 0$, since $b, d \neq 0$. Therefore, $r + s$ is a rational number. \square