

Theorem (Division Algorithm)

Let $b \in \mathbb{Z}$ and $a \in \mathbb{N}$. Then there exists a unique pair (q, r) such that

$$b = q * a + r,$$

$$0 \leq r < a.$$

We could write this as $b/a = q$ remainder r or q R r .

- 1 $14/3 = 4$ R 1 , since $14 = 4 * 3 + 1$.
- 2 $100/3 = 33$ R 1 , since $100 = 33 * 3 + 1$.
- 3 $(-13)/3 = -5$ R 2 , since $-13 = -5 * 3 + 2$.