

### Addition

$A = \text{set}, x, y \in A$

$+: A \times A \rightarrow A$

$$x + y = y + x$$

$$(x + y) + z = x + (y + z)$$

$$\exists 0 \in A, \forall x, x + 0 = x$$

$$\forall x \exists \bar{x} \quad x + \bar{x} = 0$$

$$\lambda(x + y) =$$

$$= \lambda x + \lambda y$$

$$x + (-1)x = 0$$

$$\lambda(\lambda' x) = (\lambda \lambda') x, 1 \cdot x = x$$

$$(\lambda + \lambda') x = \lambda x + \lambda' x$$

$$\lambda, \lambda' \in \mathbb{R}$$

Division in  $\mathbb{R}$

### Multiplication

$x, y, z \in A$

$\cdot: A \times A \rightarrow A$

$$(x \cdot y) \cdot z = x \cdot (y \cdot z)$$

$$(x + y) \cdot z = x \cdot z + y \cdot z$$

$$z \cdot (x + y) = z \cdot x$$

$$+ z \cdot y$$

$$\lambda x \cdot \lambda' y =$$

$$= \lambda \lambda' (x \cdot y)$$

$\text{ex}$