Theorem: minus 1 times a Vector is its Inverse

$$(-1)\,v = -v \text{ for every } v \in V$$

Proof

For $v \in V$, we have

$$v + (-1)\,v = 1v + (-1)\,v = (1 + -1)\,v = 0v = 0$$

Therefore $(-1)\,v$ is the additive inverse of v. ■