1 Problem

Prove each of the following. For (a), (b), write the proof in table form, just as in Example 1.2 of the text. For (c), (d), (e), write the proof according to the homework guidelines as a readable text. Justifications for your steps should come from the Axioms and EPI's of the text.

(a) If a, b are integers with $a + b = a$, then $b = 0$.

(b) If a, b, c, d are integers, it holds that $(a + b) + (c + d) = (a + c) + (b + d)$.

(c) If a, b, c are integers with $ac = bc$ and $c \neq 0$, then $a = b$.

(d) If a, b are integers, it holds that $(a+b)^2 = a^2 + 2ab + b^2$. (Here, for any integer x, we introduce $x^2 = x \cdot x$ and $x + x = 2x$.)

(e) If a is an integer, then the additive inverse $-a$ of a is unique. (You have to show that whenever $a + x = 0$, then $x = -a$).

(f) If a is an integer then $-(-a) = a$. (In words: The additive inverse of the additive inverse of a is a; this is a hint of how to set up the proof).

2 Problem

Using **only** *EPI #1-#2, prove that for any integer a, it holds that $-a = (-1) \cdot a$.*