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additive inverse of an inverse element

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In any ring  $R$ , the additive inverse of an element  $a \in R$  must exist, is unique and is denoted by  $-a$ . Since  $-a$  is also in the ring  $R$  it *also* has an additive inverse in  $R$ , which is  $-(-a)$ . Put  $-(-a) = c \in R$ . Then by definition of the additive inverse,  $-a + c = 0$  and  $-a + a = 0$ . Since additive inverses are unique, it must be that  $c = a$ .