

## Poof of $(-) \times (-) = +$

Prove that a negative time negative is positive.

Let  $a$  and  $b$  be any two real numbers. Consider the number  $x$  defined by

$$x = ab + (-a)(b) + (-a)(-b)$$

We can write

$$\begin{aligned}x &= ab + (-a)[(b) + (-b)] && \text{why?} \\ &= ab + (-a)(0) && \text{why?} \\ &= ab + 0 && \text{why?} \\ &= ab && \text{why?}\end{aligned}$$

Also

$$\begin{aligned}x &= [a + (-a)]b + (-a)(-b) && \text{why?} \\ &= 0 \times b + (-a)(-b) && \text{why?} \\ &= 0 + (-a)(-b) && \text{why?} \\ &= (-a)(-b) && \text{why?}\end{aligned}$$

So we have

$$x = ab$$

and

$$x = (-a)(-b)$$

Hence

$$ab = (-a)(-b) \quad \text{why?}$$