ZMATH 2015d.00543

Foster, Colin

Doubly positive.

Math. Sch. (Leicester) 44, No. 2, 34-35 (2015).

From the text: We weren't working explicitly on directed numbers at the time, but during a mathematics lesson a pupil suddenly asked me, seemingly out of the blue, 'If two minuses make a plus, why don't two pluses make a minus?' The pupil's question seemed to demonstrate a deep commitment to symmetry – the idea that what works for negatives should work in the same way for positives. This seems quite reasonable. In a multiplicative context, positive numbers and negative numbers do behave differently, and there is no reason to suppose that two positives should multiply to make a negative just because two negatives multiply to make a positive. We have a different sort of symmetry, of the $\mathbb{Z}_2$ kind – 'like numbers positive; unlike numbers negative'. The symmetry operates not at the level of individual numbers but at the level of pairs of numbers. Is this a satisfying response? Thinking about possible ways of responding to this pupil's question led me to consider the multitude of different models available for working with directed numbers. To what extent do these models complement one another, or appeal to different pupils, and to what extent do they unhelpfully clash? Are pupils better off the more models they know about?

Classification: F40 H20 H40
Keywords: laws of arithmetic; signs; symmetry; addition; multiplication; negative numbers; integers; directed numbers