7.NS Why is a Negative Times a Negative Always Positive?

Task

Some people define 3×5 as $5 + 5 + 5$, which has a value of 15.

a. If we use the same definition for multiplication, what should the value of $3 \times (-5)$ be?

b. Here is an example of the distributive property:

$$3 \times (5 + 4) = 3 \times 5 + 3 \times 4$$

If the distributive property works for both positive and negative numbers, what expression would be equivalent to $3 \times (5 + (-5))$?

If we use the fact that $5 + (-5) = 0$ and $3 \times 5 = 15$, what should the value of $3 \times (-5)$ be?

c. We can multiply positive numbers in any order:

$$3 \times 5 = 5 \times 3$$

Use what you know from parts (a) and (b). If we can multiply signed numbers in any order, what should the value of $(-5) \times 3$ be?

If the distributive property works for both positive and negative numbers, what expression would be equivalent to $(-5) \times (3 + (-3))$?

d. Use what you know from parts (a), (b), and (c). What should the value of $(-5) \times (-3)$ be?