Integers

Positive and negative counting numbers with zero.

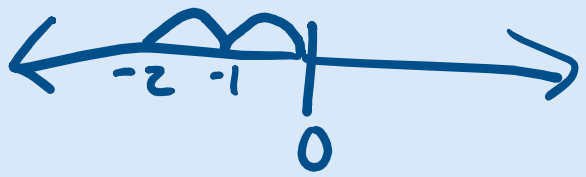
…-3, -2, -1, 0, 1, 2, 3…

Integers are discrete.

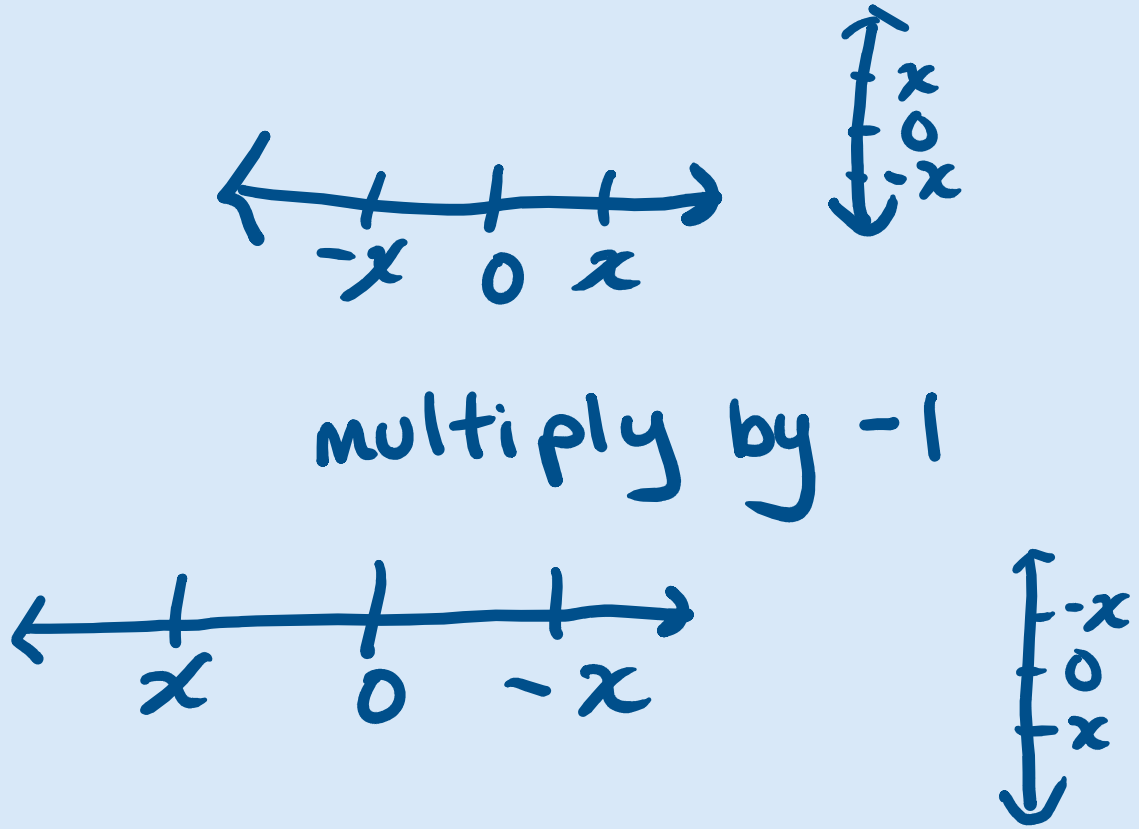
On a number line, you can think of the jumps going in the negative direction when you multiply by a negative number.

Remember, any negative number is a positive number going in the negative direction.

2*(-1) = -2

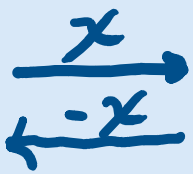


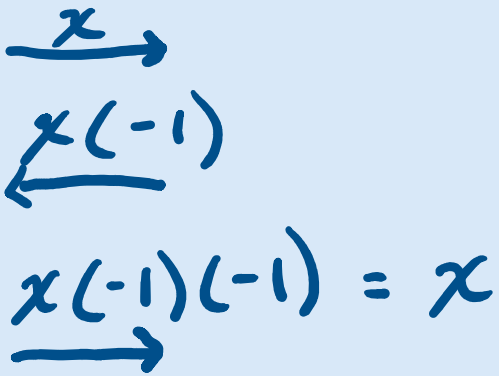
Can think of multiplying by -1 as flipping the number line. This is useful for inequalities.



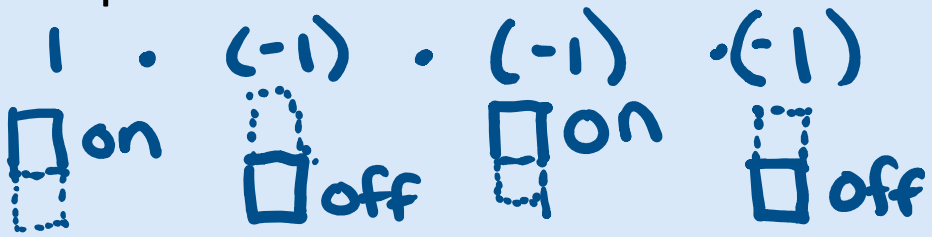
Multiplying by -1 changes the direction of the vector

-x is -1*x is (-1)x



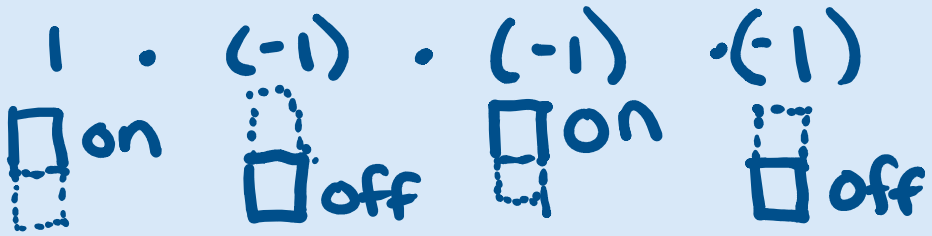


Multiplying by -1 changes the direction of the vector. You can model this with a light switch. If you start with on at positive one, then turning it off is multiplying it by negative one. If you flip the switch again, it is back up or on.



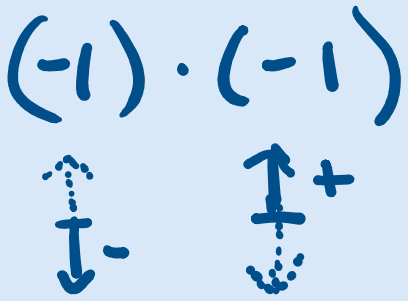
If you start with on at positive one, then turning it off is multiplying it by negative one. If you flip the switch again, it is back up or on.

Do you see the pattern here?



If you start with a negative number, then multiplying by a negative number makes the answer positive.

We say, “a negative times a negative is a positive”.



In multiplying two signed numbers, there are four possible outcomes:

$+1 \cdot +1 = +1$

$+1 \cdot -1 = -1$

$-1 \cdot +1 = -1$

$-1 \cdot -1 = +1$

> order doesn't matter

Multiple multiplications of the same number is called exponentiation. We will come back to this later. but do you see that a negative number to an odd power is negative and a negative number to an even power is positive?

$(-1)^1 = (-1)$

$(-1)^2 = (-1)(-1) = +1$

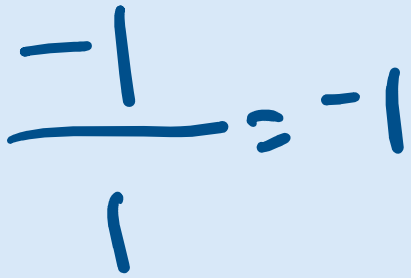
$(-1)^3 = (-1)(-1)(-1) = -1$

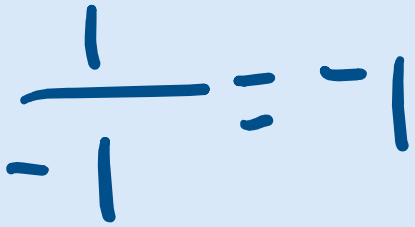
$(-1)^4 = (-1)(-1)(-1)(-1) = +1$

$(-1)^{odd} = -1$

$(-1)^{even} = +1$

The same is true for division.





I never write the negative sign on the bottom because I lose it or forget about it!

2(-x) is -2x

-2(-x) is 2x