

Working with Negative Numbers

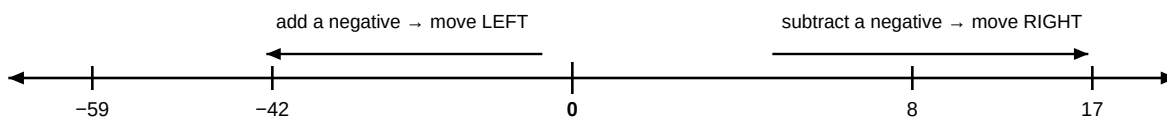
ALWAYS ASK THIS FIRST: “Am I adding/subtracting, or multiplying/dividing?” These two use *completely different* sign rules. Decide the rule first, do the numbers second.

Rule Set 1 — Adding & Subtracting

think: MOVEMENT on a number line

IF THE SIGNS ARE...	DO THIS	ANSWER'S SIGN	EXAMPLE
The same (both +, or both -)	Add the values	Keep that shared sign	$-42 + (-17) = -59$
Different (one +, one -)	Subtract the smaller value from the larger	Sign of the bigger number	$-42 + 17 = -25$

THE DOUBLE-NEGATIVE RULE: Subtracting a negative = adding a positive. $8 - (-9) \rightarrow 8 + 9 = 17$ Taking away a debt makes you richer — cancel a \$9 debt and you're \$9 better off.



Rule Set 2 — Multiplying & Dividing

think: COUNT the negatives

Count how many negative signs are in the problem. That count alone tells you the sign of the answer — **decide it before you multiply anything**. Then multiply/divide the values and attach the sign.

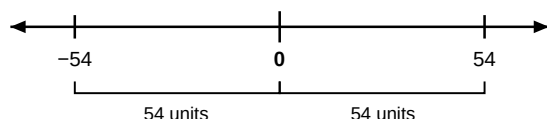
HOW MANY NEGATIVES?	ANSWER'S SIGN	EXAMPLE
EVEN (0, 2, 4, 6...)	Positive	$-42 \div (-7) = 6$ (2 negatives)
ODD (1, 3, 5...)	Negative	$-2(-3)(-4) = -24$ (3 negatives)

WATCH OUT — Same numbers, different operation, opposite answer: $-42 + (-17) = -59$ (negative), but $-42 \div (-7) = 6$ (positive). Two negatives make a *positive* only when multiplying or dividing — **never when adding**.

Absolute Value | n |

think: DISTANCE from zero — never negative

INSIDE THE BARS	RESULT
Positive	$ 54 = 54$ unchanged
Negative	$ -54 = 54$ sign dropped
Zero	$ 0 = 0$



- Bars work like parentheses.** Simplify what's inside *first*, before anything outside can touch it.
- A minus sign OUTSIDE the bars survives.** The bars only erase what's inside. $-|-7\frac{3}{5}| = -7\frac{3}{5}$
Bars give $7\frac{3}{5}$, then the outside - flips it. Shortcut: $-| \text{anything} |$ is *always* negative or zero.
- Each set of bars is its own container.** Nothing crosses between them. $|3| - |-1| = 3 - 1 = 2$

WATCH OUT — In $-|-7\frac{3}{5}|$ the two minus signs do not cancel. The inside one is deleted by the bars, so it never meets the outside one.