



Roots of Reason
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percent of WHAT?

Percent Change

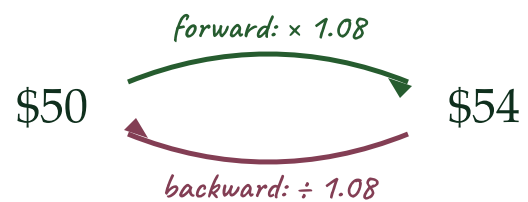
A percent change is measured from the amount before the change: the base. Name the base first.

1 One multiplier carries the whole change

up 15%	down 20%	up 100%	down 5%
$\times$ 1.15	$\times$ 0.80	$\times$ 2.00	$\times$ 0.95

Start from 100%: $100\% + 15\% = 115\% = \times 1.15$. $100\% - 20\% = 80\% = \times 0.80$. Tax, tip, and markup go up; discount goes down.

2 Undo by dividing



Taking 8% off \$54 gives \$49.68, which is wrong. To undo $\times 1.08$, divide by 1.08.

3 Two discounts do not add

$$\text{\$100} \begin{matrix} -10\% \\ (\text{\$10}) \end{matrix} \rightarrow \text{\$90} \begin{matrix} -10\% \\ (\text{\$9}) \end{matrix} \rightarrow \text{\$81}$$

The first 10% takes \$10 off \$100. The second takes \$9 off the **new base of \$90**. Total off: \$19, which is **19%**, not 20%.

Repeated percents multiply: $\times 0.90 \times 0.90 = \times 0.81$.
They do not add.

4 Name the base before you compute

discount	% of the original price , never the sale price
tax	% of the pre-tax total
tip	% of the bill before the tip
markup	% of what the store paid , the cost
commission	% of the amount sold

Different words, one habit: point at the number the percent is measured against, then multiply.

Ask: percent of what? That number is the base.