

Step-by-step in plain English

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St. Petersburg Times

MATH and STATISTICS TOOLBOX RECIPE CARDS

- [Ratio](#)
- [Percent](#)
- [Timed Math Drills \(test your mettle\)](#)
Note: electronic only

DETAIL SHEETS

- [Reducing a fraction](#)
- [Order of operations](#)
- [Terminology and math style](#)

COMING ATTRACTIONS

- More percent questions including: markdown (decrease), markup (increase), percent of total and percent change
- Millage rates
- Percent and percentage points
- Currency exchange rates
- Mean, median & mode
- Metric conversions
- Consumer Price Index

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Two classic percent questions:

Finding an
unknown
number:

Q. 1
What **number** is
15 percent of 50?

Q. 2
What **percent** of
50 is 15?



Clues: Think of the "?" in the above examples as a missing puzzle piece. Armed with some clues, you can easily finish the puzzle without it turning into an unsolved mystery! When you substitute your own numbers into these two classic questions, "OF" means *multiply* and "IS" means *equals*. Most percent questions can be answered using **both** of these question forms. Why use both? **Each question is the double check for the other.**

Common Illustrations:

classic question:

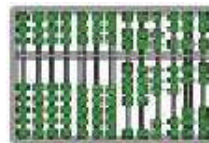
Q. 1 What **number** is 15 percent of 50?

Q. 2 What **percent** of 50 is 15?
(The "?" will be the percent number.)

classic recipe:

15/100 x 50 = ?

?/100 = 15/50, after
you cross multiply:
? x 50 = 100 x 15



Classic percent questions:

To answer your math question, first use its "Recipe A."

To check your answer, use your question's "Recipe B."

Question 1: What **number** is 15 percent of 50?

(Note: "number" is the "?" in Recipe A and the "IS" number in Recipe B)

Recipe A

Step 1. set up the recipe:
percent number x "OF" number = ?
so, **15 percent x 50 = ?**

Step 2. change the % to a decimal:
15/100 = .15

Step 3. and do the longhand math to
find the number value of "?":

$$\begin{array}{r} .15 \times 50 = ? \\ \times 50 \\ \underline{5000} \\ 75000 \end{array} \quad \begin{array}{l} \text{the problem} \\ \\ \\ \text{the answer} \end{array}$$

Step 4. putting the decimal point in
the correct place in the answer: there
are 4 place numbers to the right of the
decimal points **in the problem**, so
count over that many places **in the
answer** moving from right to left to
get: 7.5000
So, **7.5 is 15 percent of 50**



TIP: The recipes in Question 1
illustrate and explain longhand
math. When you use the
recipes in Question 2, refer to
these boxes if you need a
refresher. If you like, use
**parentheses to help clarify the order
of the math**. If you need a refresher on
the "order of operations," take a look at
the DETAIL SHEET for this topic.

Recipe B -- the double check

Step 1. set up the recipe:
 $\frac{\text{percent number}}{100} = \frac{\text{"IS" number}}{\text{"OF" number}}$
so, **$\frac{15}{100} = \frac{?}{50}$**

Step 2. cross multiply to get:
15 x 50 = 100 x ?

Step 3. divide each side by a number
so the "?" is by itself, in this case the
number you divide with is 100:
so, **$(15 \times 50) / 100 = (100 \times ?) / 100$**

Step 4. any number over itself in a
fraction equals the number 1, so you
can just cross those numbers out:
 $\frac{15 \times 50}{100} = \frac{100 \times ?}{100}$
is the same as:

$$\frac{15 \times 50 = ?}{100}$$

Step 5. do the longhand math to find
the number value of "?":
15 x 50 = 750 so, **750/100 = ?**

$$\begin{array}{r} 7.5 \quad \text{the answer} \\ 100 \overline{)750.0} \\ \underline{700} \quad (100 \times 7 = 700) \\ 500 \\ \underline{500} \quad (100 \times 5 = 500) \\ 0 \end{array}$$

So, **7.5 is 15 percent of 50**
The double check is proof the answer
in Recipe A is correct.

Question 2: What **percent** of 50 is 15?

(Note: "percent" is the "?" in both recipes)

Recipe A

Step 1. ? x 50 = 15

Step 2. (? X 50)/50 = 15/50

Step 3. ? = 15/50

Step 4. 15/50 = .3 so, ? = .3

Step 5. Multiply the decimal number
by 100 to get the percent value of "?"
.3 x 100 = 30.00 and ? = 30 percent

So, **30 percent of 50 is 15**

Recipe B -- the double check

Step 1. ?/100 = 15/50

Step 2. ? x 50 = 100 x 15

Step 3. ? x 50 = 1,500

Step 4. (? X 50)/50 = 1,500/50

Step 5. ? = 1,500/50

Step 6. 1,500/50 = 30

So, **30 percent of 50 is 15**

Practical uses for calculating a percent using the classic recipes:
percent markup (increase); percent markdown (decrease); percent of total
to show a relationship between parts within the same time frame (like a
budget year -- a way to determine the size of all pie pieces); percent
change to show a relationship between different time frames (like different
budget years); salary change based on a percent increase or decrease