

The Order of Operations

Mathematicians have decided that if there are many operations, they are to be done in a certain order. This is to prevent confusion.

1. First solve whatever is inside parentheses.

Parentheses mark what operations are priorities to be done first.

2. Next, solve multiplications and divisions, from left to right.

This does not mean multiplications are to be done before divisions. Instead, they are all equally important, or “on the same level”. For example, in $45 \div 5 + 2 \times 8$, do both the division and the multiplication first, before the addition. (It won’t matter whether you divide or multiply first.)

If there are several multiplications and divisions in a row (without addition or subtraction in between), do them from left to right. For example, in $36 \div 9 \times 5$, solve $36 \div 9$ first.

3. Last, solve additions and subtractions, from left to right.

Again, this doesn’t mean additions are done before subtractions. Instead, they’re to be done from left to right. For example, in $200 - 50 + 30 + 7$, solve $200 - 50$ first.

1. Solve what is in the parentheses first. You can enclose the operation to be done first in a “bubble.”

Example 1. $(36 + 4) \div (5 + 5)$ $\quad \backslash \quad / \quad \quad \backslash \quad /$ $= 40 \div 10$ $= 4$	a. $(50 - 2) \div (3 + 5)$	b. $20 \times (1 + 7 + 5)$
	c. $2 \times (600 \div 60) + (19 - 8)$	d. $180 \div (13 - 7 + 3)$

2. Solve. When there are several multiplications and divisions in a row, do them from left to right.

Example 2. $24 \div 3 \times 2 \div 4$ $\quad \backslash \quad /$ $= 8 \times 2 \div 4$ $\quad \backslash \quad /$ $= 16 \div 4 = 4$	a. $36 \div 4 \div 3$	b. $1,200 \div 4 \times 5 \div 3$
	c. $7 \times 90 \div 2 \times 2 \div 10$	d. $5 \times 6 \div 3 \div 2 \times 20$

Parentheses are used to change the normal order of operations. For example, if we want 9 and 18 added first, then the result multiplied by 3, we write $3 \times (9 + 18)$ or $(9 + 18) \times 3$.

(What would get done first if you wrote $3 \times 9 + 18$ or $9 + 18 \times 3$?)

3. Write a calculation for the following, and solve.

- a. First subtract 9 from 30, then multiply the result by 5.
- b. First multiply 7 and 6, then add 20 to the result.
- c. First add 14, 15, and 16, then divide that by 3.
- d. First add 27 and 37, then subtract what you get from 100.

4. Now let's do it with more operations.

- a. First add 26 and 6, then multiply that by 2, and lastly subtract what you got thus far, from 90.
- b. First multiply 5 and 7, subtract the result of that from 100, and lastly add 34 to it.
- c. First divide 36 by 9, multiply the result by 5, and subtract that from 55.

5. Solve in the right order. You can enclose the operation to be done first in a "bubble" or a "cloud."

a. $(8 + 16) \div 3 \div 2 =$ _____	b. $10 + 2 \times 9 + 8 =$ _____
c. $25 + 8 \times 5 \div 2 =$ _____	d. $10 + 2 \times (9 + 8) =$ _____
e. $120 - 2 \times (11 - 5) =$ _____	f. $2 \times (100 - 80 + 20) =$ _____

6. Division can also be written with a fraction line. Solve in the right order.

a. $6 + \frac{24}{2} =$ _____	b. $40 + \frac{32}{2} - 6 =$ _____	c. $\frac{54}{6} - 3 \times 2 =$ _____
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