Order of Operations

In this worksheet, we will work with expressions that involve different types of operations. We will gain familiarity and practice with the order of operations. Before starting, you may wish to watch the Penrose GED Prep video on order of operations. Starred problems ($\star$) have video solutions.

The Order of Operations is

- P arentheses, (absolute value)
- E xponents , roots
- M ultiply
- D ivide
- A dd
- S ubtract

The following expressions involve different types of operations. Simplify them.

$\star$ $2 + 3 - 1$ $= 4$

- $4 \cdot 7 + 3$ $= 28 + 3 = 31$

- $2^3 \cdot 3$ $= 8 \cdot 3 = 24$

- $|1 - 3|^2$ $= |-2|^2 = 2^2 = 4$

Now try some that are a little more complicated.

- $(4 - 6)(5 - 3)$ $= (-2)(-2) = 4$

- $3(4) \div (2)(3)$ $= 12 \div 6 = 2$

- $\star$ $\frac{(3^2 + 4^2)}{5}$ $= \frac{(9 + 16)}{5} = \frac{25}{5} = 5$

- $(5^2 + 12^2) \div 13$ $= (25 + 144) \div 13 = \frac{169}{13} = 13$

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These expressions are complicated and long. Be careful to do the operations in the right order and make sure each calculation is correct before moving continuing.

- $(8)(6) \div 4(1+2) - 7$ $= 48 \div 4(3) - 7 = 48 \div 12 - 7 = 4 - 7 = -3$

- $\left(\frac{10-2}{1+3} \div \frac{2^4}{2^3}\right) \cdot 5$ $= \frac{8}{4} \div \frac{16}{8} \cdot 5 = 2 \div 2 \cdot 5 = 1 \cdot 5 = 5$

- $\left(\frac{8}{2} \cdot \frac{2}{3} \div \frac{3}{1}\right) + \frac{1}{9}$ $= \left(\frac{8}{3} \cdot \frac{1}{3}\right) + \frac{1}{9} = \frac{8}{9} + \frac{1}{9} = \frac{9}{9} = \underline{1}$

- ★ $(7 - [10 - (2+1)]) \div 5$ $= (7 - [10 - 3]) \div 5 = (7 - 7) \div 5 = 0 \div 5 = 0$

- $3(4) + 3(-2) - 3(-4) + 3(5)$ $= 12 + (-6) - (-12) + 15 = 12 - 6 + 12 + 15 = 33$

For some additional clarification on how to solve problems that involve knowing the order of operations, you can click on the links listed below

- Penrose GED Prep Video
- Math is Fun
- Khan Academy