

Section 1.3 Order of Operations

In order to make it such that we all get the same answer for the same problem we have rules that tell us what order to do mathematical operations. Mathematical operations should be done in the following order:

Parenthesis
Exponents
Multiplication or Division working from left to right
Addition or Subtraction working from left to right

We often use the phrase **Please Excuse My Dear Aunt Sally** as a way to remember the order. Others use the acronym **PEMDAS** to help them remember it. Always remember the pairs '*multiplication and division*' and '*addition and subtraction*' are on the same level and should be performed from left to right.

Example: Solve $3 \cdot 5 - 2 \cdot (3 + 2) + 3^2$

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| $3 \cdot 5 - 2 \cdot (3 + 2) + 3^2$ | |
| $3 \cdot 5 - 2 \cdot 5 + 3^2$ | Parenthesis |
| $3 \cdot 5 + 2 \cdot 5 + 9$ | Exponents |
| $15 - 10 + 9$ | Multiplication |
| $5 + 9$ | Subtraction (it is to the right of the addition) |
| 14 | Addition |

Example: Solve $\frac{8 + 2 \cdot 5}{3^2}$

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| $\frac{(8 + 2 \cdot 5)}{3^2}$ | Note that the fraction bar is treated like parenthesis |
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| $\frac{8 + 10}{9}$ | First, do the multiplication on the top and then the exponent on the bottom |
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| $\frac{18}{9}$ | Next, do the addition on the top. |
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| 2 | Finally, do the division. |
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