

# Order of Operations

*Order of Operations* refers to which operations should be performed and in which order.

1. **P**arentheses (inside out)
2. **E**xponents
3. **M**ultiplication and **D**ivision (left to right)
4. **A**ddition and **S**ubtraction (left to right)

To remember the order of operations, you can think of **PEMDAS**, “**P**lease **E**xcuse **M**y **D**ear **A**unt **S**ally.”

This means that you should do what is possible within parentheses first (if parentheses are enclosed within other parentheses, work from the inside out), then exponents, then multiplication and division (from left to right), and the addition and subtraction (from left to right).

## Examples:

<b>#1</b> $4 + 5 \times 6$ $= 4 + 30$ $= 34$ <div style="float: right; text-align: right;"> Multiply Add </div>	<b>#5</b> $45 - 2^3 \times 3 + 7$ $= 45 - 8 \times 3 + 7$ $= 45 - 24 + 7$ $= 21 + 7$ $= 28$ <div style="float: right; text-align: right;"> Exponents Multiply Subtract Add </div>
<b>#2</b> $9 (6 + 5)$ $= 9 (11)$ $= 99$ <div style="float: right; text-align: right;"> Parentheses Multiply </div>	<b>#6</b> $72 \div 2 \times 3 + 4 \times 2^3 - 3^3$ $= 72 \div 2 \times 3 + 4 \times 8 - 27$ $= 36 \times 3 + 4 \times 8 - 27$ $= 108 + 32 - 27$ $= 140 - 27$ $= 113$ <div style="float: right; text-align: right;"> Exponents Divide Multiply, left to right Add Subtraction </div>
<b>#3</b> $2 (3 + 5) + 7 \times 4$ $= 2 (8) + 7 \times 4$ $= 16 + 28$ $= 44$ <div style="float: right; text-align: right;"> Parentheses Multiply, left to right Add </div>	<b>#7</b> Simplify the numerator and denominator separately, then divide, if possible.  $= \frac{2 (7 + 8) + 2}{3 \times 5 + 1}$ <div style="float: right; text-align: right;"> <u>Parentheses</u> Multiply </div> $= \frac{2 (15) + 2}{15 + 1}$ <div style="float: right; text-align: right;"> <u>Multiply</u> Add </div>
<b>#4</b> $3 \times 4 \div 2 \times 7 + 5$ $= 12 \div 2 \times 7 + 5$ $= 6 \times 7 + 5$ $= 42 + 5$ $= 47$ <div style="float: right; text-align: right;"> Multiply Divide Multiply Add </div>	$= \frac{30 + 2}{16}$ <div style="float: right; text-align: right;"> <u>Add</u> 16 </div> $= \frac{32}{16}$ <div style="float: right; text-align: right;">Divide</div> $= 2$