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:

#1

$4 + 5 \times 6$	Multiply
$= 4 + 30$	Add
$= 34$	

#2

$9 (6 + 5)$	Parentheses
$= 9 (11)$	Multiply
$= 99$	

#3

$2 (3 + 5) + 7 \times 4$	Parentheses
$= 2 (8) + 7 \times 4$	Multiply, left to right
$= 16 + 28$	Add
$= 44$	

#4

$3 \times 4 \div 2 \times 7 + 5$	Multiply
$= 12 \div 2 \times 7 + 5$	Divide
$= 6 \times 7 + 5$	Multiply
$= 42 + 5$	Add
$= 47$	

#5

$45 - 2^3 \times 3 + 7$	Exponents
$= 45 - 8 \times 3 + 7$	Multiply
$= 45 - 24 + 7$	Subtract
$= 21 + 7$	Add
$= 28$	

#6

$72 \div 2 \times 3 + 4 \times 2^3 - 3^3$	Exponents
$= 72 \div 2 \times 3 + 4 \times 8 - 27$	Divide
$= 36 \times 3 + 4 \times 8 - 27$	Multiply, left to right
$= 108 + 32 - 27$	Add
$= 140 - 27$	Subtraction
$= 113$	

#7

Simplify the numerator and denominator separately, then divide, if possible.

$= \dfrac{2 (7 + 8) + 2}{3 \times 5 + 1}$	Parentheses Multiply
$= \dfrac{2 (15) + 2}{15 + 1}$	Multiply Add
$= \dfrac{30 + 2}{16}$	Add 16
$= \dfrac{32}{16}$	Divide
$= 2$	