# The Panda Math Tutor

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# Order of Operations & Rounding Numbers

IGCSE Mathematics

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Prepared by

**Nikolas Agisilaou**

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# 1 Introduction

**Note**

The order of operations and rounding are two essential skills that underpin almost every area of mathematics. Getting the order of operations wrong can turn a correct method into a wrong answer, and rounding correctly is vital for estimation, measurement, and presenting results sensibly.

**In this chapter, we will explore:**

- The BIDMAS/BODMAS rules for order of operations
- Working with brackets, indices, and the four operations
- Rounding to decimal places
- Rounding to significant figures
- Truncation vs rounding
- Estimation using rounding
- Upper and lower bounds

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# 2 Order of Operations (BIDMAS)

**Definition**

The **order of operations** is the set of rules that determines the sequence in which calculations are carried out. In the UK and IGCSE syllabuses, this is remembered using the mnemonic **BIDMAS** (also known as BODMAS or PEMDAS).

| | | |
|---|---|---|
| **B** | **Brackets** | ( ) — work out the contents of brackets first |
| **I** | **Indices** | Powers and roots, e.g. $3^2$, $\sqrt{16}$ |
| **D** | **Division** | $\div$ — left to right with multiplication |
| **M** | **Multiplication** | $\times$ — left to right with division |
| **A** | **Addition** | $+$ — left to right with subtraction |
| **S** | **Subtraction** | $-$ — left to right with addition |

**Note**

**Key points about BIDMAS:**

- Division and multiplication have **equal priority** — evaluate them left to right.
- Addition and subtraction have **equal priority** — evaluate them left to right.
- If there are nested brackets, work from the **innermost** brackets outward.
- A fraction bar acts like a bracket around the numerator and denominator.

## 2.1 Brackets

**Method**

**Working with Brackets**

**Step 1:** Identify all brackets in the expression

**Step 2:** If brackets are nested, start with the innermost pair

**Step 3:** Evaluate the expression inside each pair of brackets using BIDMAS

**Step 4:** Replace the bracket with its result and continue

**Types of brackets you may encounter:**

- Parentheses: ( )
- Square brackets: [ ] — often used as outer brackets
- The numerator and denominator of a fraction each act as implied brackets

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**Example**

Evaluate $7 \times (3 + 6)$.

**Solution:**

$$\begin{aligned} 7 \times (3 + 6) &= 7 \times 9 \quad \text{(brackets first)} \\ &= 63 \end{aligned}$$

# Preview ends here

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