The Panda Math Tutor

www.thepandamathtutor.com

Standard Form

IGCSE Mathematics

The Panda Math Tutor

Prepared by

Nikolas Agisilaou

Contents

1 Introduction to Standard Form **2**

2 What is Standard Form? **2**

3 Converting Ordinary Numbers to Standard Form **3**
3.1 Large Numbers 3
3.2 Small Numbers 5

4 Converting from Standard Form to Ordinary Numbers **6**

5 Ordering and Comparing Numbers in Standard Form **7**

6 Calculations with Standard Form **8**
6.1 Multiplication 8
6.2 Division 9
6.3 Addition and Subtraction 10

7 Using a Calculator with Standard Form **11**

8 Real-World Applications **12**
8.1 Worked Problems 13

9 Summary **15**

10 Additional Resources **16**
10.1 Tips for Success in IGCSE Exams 16
10.2 Common Exam Questions 16

The Panda Math Tutor

1 Introduction to Standard Form

Note

Standard form (also called scientific notation) is a convenient way of writing very large or very small numbers. Scientists, engineers, and mathematicians use standard form every day to handle numbers like the distance between planets or the size of atoms.

In this chapter, we will explore:

- What standard form is and why we use it
- Converting ordinary numbers to standard form
- Converting standard form back to ordinary numbers
- Ordering and comparing numbers in standard form
- Performing calculations in standard form
- Using your calculator with standard form
- Real-world applications

The Panda Math Tutor

2 What is Standard Form?

Definition

A number is in **standard form** when it is written as:

$$a \times 10^n$$

where:

- a is a number such that $1 \leq a < 10$ (i.e. a has exactly one non-zero digit before the decimal point)
- n is an integer (positive, negative, or zero)

Examples:

- $3.2 \times 10^5 = 320\,000$
- $7.08 \times 10^{-3} = 0.00708$

Note

Key Facts:

- If the original number is large (≥ 10), the power n is **positive**
- If the original number is between 1 and 10, the power n is **zero**
- If the original number is small (< 1), the power n is **negative**

Warning

Common Mistake: Not all expressions with $\times 10^n$ are in standard form!
The value of a must satisfy $1 \leq a < 10$.
NOT standard form:

- 32×10^4 ($a = 32$, which is ≥ 10)
- 0.5×10^6 ($a = 0.5$, which is < 1)

Correct standard form:

- $32 \times 10^4 = 3.2 \times 10^5$
- $0.5 \times 10^6 = 5 \times 10^5$

The Panda Math Tutor

3 Converting Ordinary Numbers to Standard Form

3.1 Large Numbers

Method

Converting Large Numbers to Standard Form

Step 1: Place the decimal point after the first non-zero digit to get the value of a

Step 2: Count how many places the decimal point has moved from its original position

Step 3: This count becomes the positive power n

Step 4: Write as $a \times 10^n$

Preview ends here

14 more pages are in the full pack.

Standard Form — Main Notes — €9.99

Buy the pack and the complete PDF lands in your inbox.

Personal study use only — please don't resell or share.