The Panda Math Tutor

www.thepandamathtutor.com

Linear Equations

IGCSE Mathematics

The Panda Math Tutor

Prepared by

Nikolas Agisilaou

Contents

1 Introduction to Linear Equations 2

2 What is a Linear Equation? 2

3 Solving One-Step Equations 3

4 Solving Two-Step Equations 5

5 Equations with Brackets 7

6 Equations with Fractions 9

7 Equations with Unknowns on Both Sides 11

8 Forming and Solving Equations from Word Problems 14

9 Summary 16

10 Additional Resources 17
10.1 Tips for Success in IGCSE Exams 17
10.2 Common Exam Questions 17

The Panda Math Tutor

1 Introduction to Linear Equations

Note

Linear equations are one of the most important topics in algebra. They appear throughout IGCSE Mathematics and provide the foundation for understanding graphs, simultaneous equations, inequalities, and many real-world problem-solving scenarios.

In this chapter, we will explore:

- What linear equations are and their key properties
- Solving one-step and two-step equations
- Equations with brackets and fractions
- Equations with unknowns on both sides
- Setting up and solving word problems
- Graphs of linear equations

The Panda Math Tutor

2 What is a Linear Equation?

Definition

A **linear equation** is an equation in which the highest power of the unknown variable is 1.

The general form of a linear equation in one variable is:

$$ax + b = c$$

where a, b, and c are constants and $a \neq 0$.

Examples of linear equations:

- $3x + 5 = 14$
- $2y - 7 = 11$
- $\frac{x}{4} = 6$

Not linear equations:

- $x^2 + 3 = 12$ (power of 2 — this is quadratic)

- $\frac{1}{x} = 5$ (x is in the denominator)
- $\sqrt{x} = 4$ (involves a square root of x)

Note

Key Vocabulary:

- **Variable:** The unknown letter (usually x, y, or another letter)
- **Coefficient:** The number multiplied by the variable (e.g., in $3x$, the coefficient is 3)
- **Constant:** A number on its own (e.g., in $3x + 5$, the constant is 5)
- **Solution:** The value of the variable that makes the equation true

The Balance Principle

An equation is like a balanced set of scales. Whatever you do to one side, you must do exactly the same to the other side to keep it balanced.
If $a = b$, then:

- $a + c = b + c$ (add the same number to both sides)
- $a - c = b - c$ (subtract the same number from both sides)
- $a \times c = b \times c$ (multiply both sides by the same number)
- $\frac{a}{c} = \frac{b}{c}$ (divide both sides by the same number, $c \neq 0$)

The Panda Math Tutor

3 Solving One-Step Equations

Definition

A **one-step equation** requires just a single operation (addition, subtraction, multiplication, or division) to isolate the variable.

Preview ends here

15 more pages are in the full pack.

Linear Equations — 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.