315 Pages

Introduction

Chapter 1 SI Units

Learning Outcome

Perform simple calculations involving SI units.

Learning Objectives

1. Describe basic SI units, matching associated symbols for unit prefixes.
2. Perform unit analysis in simple problems.
3. List derived SI units and their associated symbols.
4. Perform conversions both within and between SI and imperial units.

Chapter 2 Basic Arithmetic Operations

Learning Outcome

Perform basic arithmetic operations without the use of a calculator.

Learning Objectives

1. Add and subtract integers.
2. Multiply and divide whole and decimal numbers.
3. Perform arithmetic operations involving combinations of addition, subtraction, multiplication, division, and powers in the proper order of operation.
4. Simplify algebraic expressions and operations involving the removal of insertion of brackets.

Chapter 3 Fractions, Decimals, and Percentages

Learning Outcome

Perform basic arithmetic operations involving fractions, decimals, and percentages.

Learning Objectives

1. Identify proper and improper fractions and mixed numbers.
2. Add, subtract, and multiply fractions, and reduce them to lowest terms.
3. Convert fractions to decimal numbers and decimal numbers to fractions.
4. Analyze percentage problems.

Chapter 4 Ratio and Proportion

Learning Outcome

Describe the concepts of ratio and proportion.

Learning Objectives

1. Convert ratios of one quantity to another quantity.
2. Solve word problems involving ratios and proportions.

Chapter 5 Equations and Transposition

Learning Outcome

Transpose equations in order to find values for different variables in a formula.

Learning Objectives

1. Solve equations and word problems.
2. Apply an organized, systematic approach to solving a problem and presenting the solution.

Chapter 6 Roots, Powers, and Logarithms

Learning Outcome

Solve problems using algebraic operations, including equations and logarithms.

Learning Objectives

1. Apply the rules for powers and roots to the multiplication and division of quantities and expressions.
2. Solve equations involving roots, powers, and fractions.
3. Explain common and Napierian (natural) logarithms. Using a calculator, perform mathematical operations and solve equations that contain logarithms.

Chapter 7 Length, Lines, and Simple Plane Figures

Learning Outcome

Describe measurement of length, types of lines and angles, and calculate perimeters and areas of simple plane figures.

Learning Objectives

1. Describe linear measurement systems and convert measurement units from one system to another.
2. Define parallel and perpendicular lines and types of angles.
3. Describe types of simple plane figures, including triangles and quadrilaterals.
4. Describe the components of a circle, including circumference, area, and diameter.

Chapter 8 Trigonometry

Learning Outcome

Explain trigonometric concepts and solve problems involving trigonometry.

Learning Objectives

1. Identify the types of angles and specify angle size in degrees and radians.
2. Identify right, obtuse, and acute triangles, and apply the naming convention for sides and angles.
3. Use the Pythagorean theorem to calculate the side lengths of a right angle triangle and solve simple problems involving right triangles.
4. Explain the sine, cosine, and tangent of an angle, and determine the values of these functions for all angles between 0 and 360 degrees.
5. Using sine, cosine, and tangent, find the dimensions of right triangles and solve physical problems involving right triangles.
6. Define the sine rule and the cosine rule, and use these rules to determine the unknown dimensions of oblique triangles.

Chapter 9 Areas and Volumes of Solids

Learning Outcome

Calculate the volumes of rectangular objects, cylinders, and spheres and the surface areas of cylinders and spheres.

Learning Objectives

1. Convert between commonly-used volume units.
2. Define the following quadrilaterals and calculate their areas: rectangle, square, rhomboid, rhombus, trapezoid, and trapezium.
3. Calculate the volume of a rectangular prism.
4. Calculate the surface area and volume of a cylinder.
5. Calculate the surface area and volume of a sphere.
6. Define terms and solve problems involving the surface areas and volumes of pyramids, cones, and frustums.

Summary

Self-Test Answer Guide

Knowledge Exercises Answer Guide