

## Preface

The learning of Mathematics imparts many skills that contribute to the development of the human mind. It trains the learner to think methodically and rationally, analyse various types of situations, anticipate and plan, make decisions and solve problems. Mathematics also serves as a tool that facilitates the gaining of knowledge related to science and technology. Mathematical skills and knowledge are indeed essential to enhance our standard and quality of living in the modern area.

The Basic Education Core Curriculum aims to inculcate the following five key competencies among students:

1. Communication Skill
2. Thinking Skill
3. Problem – Solving Skill
4. Applying Life Skill
5. Technological Application Skill

The learning areas in the study of mathematics are designed to enable students to acquire mathematical skills and knowledge according to their utmost potential. The learning areas are as follows:

- **Numbers and Operations:** numerical concepts and sense of perception; real number system; properties of real numbers; operation of numbers; ratio; percentage; problem-solving involving numbers; and application of numbers in real life.

- **Measurement:** length; distance; weight; area; volume and capacity; money and time; measuring units; estimation for measurement; trigonometric ratio; problem-solving regarding measurement; and application of measurement in various situations

- **Geometry:** geometric figures and properties of one-dimensional geometric figures; visualization of geometric models; geometric theories; and geometric transformation through translation, reflection and rotation

- **Algebra:** pattern; relationship; function; sets and their operations; reasoning; expression; equation; equation system; inequality; graph; arithmetic order; geometric order; arithmetic series; and geometric series

- **Data Analysis and Probability:** determining an issue; writing questions; determining methods of study; study; data collection, systematization and presentation; central tendency and data distribution; data analysis and interpretation; opinion polling; probability; application of statistical knowledge and probability; application of probability in explaining various situations as well as for facilitating decision-making in real life

- **Mathematical Skills and Processes:** problem-solving through diverse methods; reasoning; communication; communication and presentation of mathematical concepts; linking mathematics with other disciplines; and attaining ability for creative thinking

## Strands and Learning Standards

### **Strand 1: Numbers and Operations**

- Standard M1.1: Understanding diverse methods of presenting numbers and their application in real life
- Standard M1.2: Understanding results of operations of numbers, relationships of operations, and application of operations for problem-solving
- Standard M1.3: Use of estimation in calculation and problem-solving
- Standard M1.4: Understanding of numerical system and application of numerical properties

### **Strand 2: Measurement**

- Standard M2.1: Understanding of the basics of measurement; ability to measure and estimate the size of objects to be measured
- Standard M2.2: Solving measurement problems

### **Strand 3: Geometry**

- Standard M3.1: Ability to explain and analyse two-dimensional and three-dimensional geometric figures
- Standard M3.2: Ability for visualisation, spatial reasoning and application of geometric models for problem-solving

### **Strand 4: Algebra**

- Standard M4.1: Understanding and ability to analyse pattern, relation and function
- Standard M4.2: Ability to apply algebraic expressions, equations, inequalities, graphs and other mathematical models to

represent various situations as well as interpretation and application for problem-solving

**Strand 5: Data Analysis and Probability**

Standard M5.1: Understanding and ability to apply statistical methodology for data analysis

Standard M5.2: Application of statistical methodology and knowledge of probability for valid estimation

Standard M5.3: Application of knowledge of statistics and probability for decision-making and problem-solving

**Strand 6: Mathematical Skills and Processes**

Standard M6.1: Capacity for problem-solving, reasoning; communication and presentation of mathematical concept; linking various bodies of mathematical knowledge and linking mathematics with other disciplines; and attaining ability for creative thinking

For common understanding and correct interpretation, the curriculum prescribes various codes for learning standards and indicators. One example is shown below:

M 1.1 Gr 7/2	
M	Subject area of Mathematics
1.1	First subject area, Standard 1
Gr7/2	Indicator 2 for Grade (Mathayom) 7

## Learners' Quality

- Understand concepts of numbers, ratio, proportion, percentage, real numbers expressed in exponential notation with integer indices, square root and cube root of real numbers; can carry out operations involving integral numbers, fractions, decimals, exponents, square roots and cube roots of real numbers; can apply numerical knowledge in real life.

- Have knowledge and understanding of surface areas of prisms and cylinders, and volume of prisms, cylinders, pyramids, cones and spheres; can appropriately choose units of the various systems of measuring length, area, and volume; and can apply knowledge of measurement in real life.

- Can construct and explain stages of constructing two-dimensional geometric figures with compass and straight edge; can explain characteristics and properties of three-dimensional geometric figures, i.e., prisms, pyramids, cylinders, cones and spheres.

- Understand properties of congruence and similarities of triangles, parallels, Pythagoras' theorems and converse; can apply these properties for reasoning and problem-solving; and understand geometric transformation through translation, reflection and rotation.

- Can visualise and explain characteristics of two-dimensional and three-dimensional geometric figures.

- Can analyse and explain relationships of patterns, situations or problems; and can use single-variable linear equations, two-variable linear equation systems, single-variable linear inequality, and graphs in problem-solving.

- Can determine an issue, write questions about a problem or a situation, determine methods of study and collect and present data by utilizing pie charts or any other forms of presentation.

- Understand concepts of the measures of central tendency, arithmetic mean, median, and mode of non-frequency distribution data that can be chosen appropriately for application, as well as apply knowledge in considering statistical data and information.

- Understand the concepts of random sampling and probability; can apply knowledge of probability for projecting and for decision-making in various situations.

- Can apply diverse methods for problem-solving; avail mathematical and technological knowledge, skills and processes appropriately to solve problems faced in various situations; can suitably provide reasoning for decision-making and appropriately present the conclusion reached; can use mathematical language and symbols for communication; can communicate and present mathematical concepts accurately and clearly; can link various bodies of mathematical knowledge; can link mathematical knowledge, principles and processes with other disciplines; and have attained ability for creative thinking.

## Yearly Teaching Plan

Mathematics

Grade 7 (Mathayom 1)

10 chapters

120 hours

<b>Learning area</b>	<b>Duration (hours)</b>
<b>1. Number Sequences and Integers</b> <ul style="list-style-type: none"><li>• Number patterns and sequences</li><li>• Integers</li><li>• Addition and subtraction of integers</li><li>• Multiplication and division of integers</li><li>• Combined operations of integers</li></ul>	<b>15</b>
<b>2. Fractions</b> <ul style="list-style-type: none"><li>• Comparing fractions</li><li>• Addition and subtraction of fractions</li><li>• Multiplication and division of fractions</li><li>• Combined operations of fractions</li></ul>	<b>13</b>
<b>3. Decimals</b> <ul style="list-style-type: none"><li>• Comparing decimals</li><li>• Addition and subtraction of decimals</li><li>• Multiplication and division of decimals</li><li>• Combined operations</li></ul>	<b>10</b>
<b>4. Indices</b> <ul style="list-style-type: none"><li>• Indices</li><li>• Multiplication of numbers in index notation</li><li>• Division of numbers in index notation</li><li>• Raising numbers and algebraic terms in index notation to a power</li><li>• Negative integral indices</li><li>• Fractional indices</li><li>• Computation involving laws of indices</li></ul>	<b>21</b>
<b>5. Exponential Notation</b> <ul style="list-style-type: none"><li>• Exponential notation</li><li>• Addition and subtraction in exponential notation</li><li>• Multiplication and division in exponential notation</li><li>• Combined operations using exponential notation</li></ul>	<b>12</b>

<b>6. Geometrical Constructions</b> <ul style="list-style-type: none"> <li>• Construction</li> </ul>	<b>15</b>
<b>7. Solid Geometry</b> <ul style="list-style-type: none"> <li>• Cubes and cuboids</li> <li>• Plan, front elevation and side elevation of 3-D geometrical shapes</li> </ul>	<b>10</b>
<b>8. Linear Equations</b> <ul style="list-style-type: none"> <li>• Equality</li> <li>• Linear equations in one unknown</li> <li>• Solution of linear equations in one unknown</li> </ul>	<b>11</b>
<b>9. Relations, Coordinates and Line Graphs</b> <ul style="list-style-type: none"> <li>• Relations</li> <li>• Coordinates</li> <li>• Scales of the coordinate axes</li> <li>• Line graphs</li> </ul>	<b>10</b>
<b>10. Probability</b> <ul style="list-style-type: none"> <li>• Probability</li> </ul>	<b>3</b>

**Note:** The hours needed for each subtopic can be changed when necessary.

The above allocated hours are just a suggestion. Total hours for this subject is as prescribed in the basic learning time structure, while the learners must attain the standard as prescribed in the learning standards and indicators.

## Chapter 1 Number Sequences and Integers

Indicators and learning areas (15 hours)

Indicator	Learning Area
M4.1 Gr7/1 Analyse and explain relations of a given pattern.	<ul style="list-style-type: none"> <li>• Number patterns and sequences</li> </ul>
M1.1 Gr7/1 Specify or give examples and compare added integral numbers, subtracted integral number, 0, fractions and decimals.	<ul style="list-style-type: none"> <li>• Integers</li> </ul>
<p>M1.2 Gr7/1 Add, subtract, multiply and divide integral numbers for the purpose of problem-solving; be aware of validity of the answers; explain the results obtained from the addition, subtraction, multiplication, and division, and explain the relationship between addition and subtraction, and between multiplication and division of integral numbers.</p> <p>M1.2 Gr7/3 Explain results of expression in exponential notation of integral numbers, ratios and decimals.</p> <p>M1.3 Gr7/1 Use estimation appropriately in various situations, as well as for considering validity of answers reached through calculation.</p> <p>M1.4 Gr7/1 Apply knowledge and properties of integers for problem-solving</p>	<ul style="list-style-type: none"> <li>• Addition and subtraction of integers</li> <li>• Multiplication and division of integers</li> <li>• Combined operations of integers</li> </ul>

## **Learning Objectives**

Students will be taught to:

1. Analyse, recognise and explain given number patterns.
2. Understand, compare and arrange integers in order.
3. Understand the relation, properties and the process of addition, subtraction, multiplication and division of integers. Aware of the validities of the answers too.
4. Perform the computations involving any combination of addition, subtraction, multiplication and division of integers to solve problems.
5. Use estimations to verify the answers.

## **Learning Outcomes**

Students will be able to:

1. Analyse, recognise and explain simple number patterns.
2. Recognise, describe, find the number pattern and find any of the terms required when given a number sequence..
3. Understand what integers including zero are.
4. Represent integers using number lines.
5. Compare two integers.
6. Arrange integers in increasing or decreasing order.
7. Use positive numbers and negative numbers.
8. Understand what addition, subtraction, multiplication and division are and their properties.
9. Perform addition, subtraction, multiplication and division of integers.
10. Solve problems involving addition, subtraction, multiplication and division of integers.
11. Perform computations involving any combination of addition, subtraction, multiplication and division of integers.

12. Solve problems involving combined operations of addition, subtraction, multiplication and division of integers.
13. Explain and aware of the validities of the answers to the operations.
14. Verify answers using estimations.

### **Learning Areas**

- Number patterns and sequences
- Integers
- Addition and subtraction of integers
- Multiplication and division of integers
- Combined operations of integers

### **Teaching and Learning Activities**

#### **1<sup>st</sup> – 3<sup>rd</sup> hours (Number patterns and sequences)**

1. Explain what sequence number and term mean.
2. Explain the few common sequence numbers such as even numbers, odd numbers, square numbers, cube numbers, triangular numbers and Fibonacci numbers.
3. Have volunteers work on Questions 1(a) and 1(b) in Test Yourself 1.1. Discuss the methods used and the answers obtained.
4. Have students work individually on the rest of Question 1 in Test Yourself 1.1. Check the answers with students.
5. Ask students to do Questions 1 to 3 on page 2 of the Workbook as their homework.
6. Explain how to get the required terms using Example 2 in the Textbook.
7. Have volunteers to solve Questions 2(a) and 2(b) in Test Yourself 1.1. Discuss the methods used and the answers obtained.
8. Have students work individually on the rest of Question 2 in Test Yourself 1.1. Check the answers with students.

9. Ask students to do Question 4 on page 3 of the Workbook as their homework.

#### **4<sup>th</sup> -5<sup>th</sup> hours (Integers)**

1. Explain what integers (inclusive of positive integers, zero and negative integers) are using Examples 3 and 4 in the Textbook.
2. Have students work individually on Questions 1 to 3 in Test Yourself 1.2. Discuss the answers with them.
3. Using Examples 5 to 9 in the Textbook, explain the use of number lines to represent, compare and arrange integers.
4. Have students work individually on Questions 4 to 9 in Test Yourself 1.2. Discuss the answers with them.
5. Give a few examples of real situations that use positive and negative numbers. Refer to the pages 9 and 10.
6. Have students work individually on Questions 10 and 11 in Test Yourself 1.2. Discuss the answers with them.
7. Ask students to do the questions on pages 4 and 5 of the Workbook as their homework.

#### **6<sup>th</sup> – 8<sup>th</sup> hours (Addition and subtraction of integers)**

1. Explain the meaning of addition and its properties using Examples 11 to 14.
2. Have students work individually on Questions 1 to 6 in Test Yourself 1.3. Discuss the answers with them.
3. Ask students to do the questions on pages 6 and 7 of the Workbook as their homework.
4. Explain the meaning of subtraction using Examples 15 to 18.
5. Have volunteers do Questions 7 to 11 in Test Yourself 1.3. Discuss the methods used and answers obtained with them.

6. Ask students to do the questions on pages 8 and 9 of the Workbook as their homework.

### **9<sup>th</sup> – 11<sup>th</sup> hours (Multiplication and division of integers)**

1. Explain the rules of multiplication by using Examples 19 to 21 in the Textbook.
2. Have students work individually on Questions 1 to 4 in Test Yourself 1.4. Discuss the answers with them.
3. Explain the four properties of multiplication using Example 22 in the Textbook.
4. Ask students to do Questions 1 to 3 on pages 10 and 9 of the Workbook as their homework.
5. Using Examples 23 to 25, show how to divide integers.
6. Test a few students' understanding of division by asking them to solve problems in Questions 6 to 9 in Test Yourself.
7. Ask students to do the questions 4 and 5 on pages 11 and 12 of the Workbook as their homework.

### **12<sup>th</sup> – 14<sup>th</sup> hours (Combined operations of integers)**

1. Emphasize the sequence of solving problems involving combined operations by using Examples 26 to 30 in the Textbook.
2. Randomly select a few students to show the working method to solve the problems in Test Yourself 1.5.
3. Ask students to do the questions in subtopic 1.5 on pages 12 and 15 of the Workbook as their homework.

### **15<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 26.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 27.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics:**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials:**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 1 Number Sequences and Integers**

#### **Explanation: Summary of learning outcomes**

**Chapter 1  
Number Sequences  
and Integers**

Feeling after learning this chapter:  
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Contents that you need for teacher to explain further:  
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Knowledge gained from this chapter:  
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Contents that you like the most in this chapter (give your reason):  
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Exercises that you like and want to be selected as the outstanding work:  
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Application of knowledge from this chapter on your daily life:  
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## Chapter 2 Fractions

Indicators and learning areas (13 hours)

Indicator	Learning Area
M1.1 Gr7/1 Specify or give examples and compare added integral numbers, subtracted integral numbers, 0, fractions and decimals.	<ul style="list-style-type: none"><li>• Comparing fractions</li></ul>
M1.2 Gr7/2 Add, subtract, multiply and divide fractions and decimals for the purpose of problem-solving; be aware of validity of the answers; explain the results of the addition, subtraction, multiplication and division; and explain relationships between addition and subtraction, and between multiplication and division of fractions and decimals.	<ul style="list-style-type: none"><li>• Addition and subtraction of fractions</li><li>• Multiplication and division of fractions</li><li>• Combined operations of fractions</li></ul>
M1.2 Gr7/3 Explain results of expression in exponential notation of integral numbers, ratios and decimals.	
M1.3 Gr7/1 Use estimation appropriately in various situations, as well as for considering validity of answers reached through calculation.	

### Learning Objectives

Students will be taught to:

1. Understand and compare fractions.
2. Understand and perform the computations of addition, subtraction, multiplication and division involving fractions.
3. Perform the computations involving any combination of addition, subtraction, multiplication and division of fractions to solve problems.
4. Aware of the validities of the answers.
5. Use estimations to verify the answers.

## Learning Outcomes

Students will be able to:

1. Compare two fractions and mixed numbers.
2. Perform addition involving
  - a. fractions with common denominators
  - b. fractions with different denominators
  - c. whole numbers and fractions
  - d. fractions and mixed numbers
  - e. mixed numbers
3. Perform subtraction involving
  - a. fractions with common denominators
  - b. fractions with different denominators
  - c. a fraction from a whole number
  - d. a fraction from a mixed number
  - e. mixed numbers
4. Perform multiplication involving
  - a. a whole number and a fraction
  - b. fractions
  - c. mixed numbers
5. Perform division involving
  - a. fractions by whole numbers
  - b. fractions
  - c. mixed numbers
6. Perform the computations involving any combination of addition, subtraction, multiplication and division of fractions.
7. Solve problems involving combined operations of addition, subtraction, multiplication and division of fractions to solve problems.
8. Explain and aware of the validities of the answers obtained.
9. Verify answers using estimations.

## Learning Areas

- Comparing fractions
- Addition and Subtraction of fractions
- Multiplication and division of fractions
- Combined operations of fractions

## Teaching and Learning Activities

### **1<sup>st</sup> – 3<sup>rd</sup> hours (Comparing fraction)**

1. Have students explain of what they understand about fractions by looking at the diagrams on page 31.
2. Remind students of denominators and numerators of fractions.
3. Explain the values of fractions using a number line.
4. Explain how to compare fractions by using Examples 1 to 3.
5. Have volunteers try Questions 1 to 3 in Test Yourself 2.1. Discuss the answers with them.
6. Ask students to do the exercises on page 18 of the Workbook as their homework.

### **4<sup>th</sup> – 6<sup>th</sup> hours (Addition and subtraction of fraction)**

1. Using Examples 4 to 9, show students how to add various fractions.
2. Test students' understanding by asking them to do Questions 1 to 3 in Test Yourself 2.2 in the class.
3. Repeat the steps for subtraction by using Examples 10 to 17.
4. Test students' understanding by asking them to do Questions 4 to 6 in Test Yourself 2.2 in the class.
5. Ask students to do the exercises on page 19 to 24 of the Workbook as their homework.

### **7<sup>th</sup> – 9<sup>th</sup> hours (Multiplication and division of fraction)**

1. By using Examples 18 to 22, show how to multiply fractions.
2. Randomly choose a few students to try Questions 1 to 5 in Test Yourself 2.3.
3. Show students the way to divide fractions using Examples 23 to 28. Emphasize writing the divisor as its reciprocal.
4. Have students work individually Questions 6 and 7 in Test Yourself 2.3.
5. Have two volunteers try out Questions 8 and 9 in Test Yourself 2.3. Discuss the answers with them.
6. Ask students to do the exercises of this subtopic on page 25 to 30 of the Workbook as their homework.

### **10<sup>th</sup> – 12<sup>th</sup> hours (Combined operations)**

1. Emphasize the steps to perform computation of combined operations.
2. Show students the way to perform computation of combined operations by using Examples 29 to 33.
3. Have students work individually Questions 1 to 5 in Test Yourself 2.4.
4. Ask students to do the exercises of this subtopic on page 30 to 33 of the Workbook as their homework.

### **13<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 54.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 55.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 2 Fractions**

**Explanation: Summary of learning outcomes**

**Chapter 2 Fractions**

Contents that you need for teacher to explain further:  
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Feeling after learning this chapter:  
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Knowledge gained from this chapter:  
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Application of knowledge from this chapter on your daily life:  
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Exercises that you like and want to be selected as the outstanding work:  
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Contents that you like the most in this chapter (give your reason):  
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## Chapter 3 Decimals

Indicators and learning areas (10 hours)

Indicators	Learning Areas
M1.1 Gr7/1 Specify or give examples and compare added integral numbers, subtracted integral numbers, 0, fractions and decimals.	<ul style="list-style-type: none"><li>• Comparing decimals</li></ul>
M1.2 Gr7/2 Add, subtract, multiply and divide fractions and decimals for the purpose of problem-solving; be aware of validity of the answers; explain the results of the addition, subtraction, multiplication and division; and explain relationships between addition and subtraction, and between multiplication and division of fractions and decimals.	<ul style="list-style-type: none"><li>• Addition and subtraction of decimals</li><li>• Multiplication and division of decimals</li><li>• Combined operations of decimals</li></ul>
M1.2 Gr7/3 Explain results of expression in exponential notation of integral numbers, ratios and decimals.	
M1.3 Gr7/1 Use estimation appropriately in various situations, as well as for considering validity of answers reached through calculation.	

### Learning Objectives

Students will be taught to:

1. Understand and compare decimals.
2. Understand and perform the computations of addition, subtraction, multiplication and division involving decimals.
3. Perform the computations involving any combination of addition, subtraction, multiplication and division of decimals to solve problems.

4. Aware of the validities of the answers.
5. Use estimations to verify the answers.

### **Learning Outcomes**

Students will be able to:

1. Compare decimals.
2. Perform addition, subtraction, multiplication and division involving decimals.
3. Perform the computations involving any combination of addition, subtraction, multiplication and division of decimals.
4. Solve problems involving combined operations of addition, subtraction, multiplication and division of decimals to solve problems.
5. Explain and aware of the validities of the answers obtained.
6. Verify answers using estimations.

### **Learning Areas**

- Comparing decimals
- Addition and Subtraction of decimals
- Multiplication and division of decimals
- Combined operations of decimals

### **Teaching and Learning Activities**

#### **1<sup>st</sup> hour (Comparing decimals)**

1. Explain the values of decimals using a number line.
2. Explain how to compare fractions by using Example 1.
3. Have volunteers try Question 1 in Test Yourself 3.1.
4. Ask students to do the exercises on page 38 of the Workbook as their homework.

### **2<sup>nd</sup> – 3<sup>rd</sup> hours (Addition and subtraction of decimals)**

1. Using Examples 2 to 5, show students how to add and subtract decimals.
2. Remind students to align the numbers vertically to their place values.
3. Test the students' understanding by asking them to do Questions 1 to 6 in Test Yourself 3.2. Discuss the answers with them.
4. Ask students to do the exercises on pages 39 to 41 of the Workbook as their homework.

### **4<sup>th</sup> – 6<sup>th</sup> hours (Multiplication and division of decimals)**

1. Show students how to multiply and divide decimals by 0.1, 0.01, 0.001, 10, 100 and 1000.
2. By using Examples 9 to 15, show how to multiply and divide decimals.
3. Randomly choose a few students to try Questions 1 to 8 from Test Yourself 3.3.
4. Have three volunteers try Questions 9 to 11 in Test Yourself 3.3. Discuss the answers with them.
5. Ask students to do the exercises of this subtopic on page 42 to 45 of the Workbook as their homework.

### **7<sup>th</sup> – 9<sup>th</sup> hours (Combined operations)**

1. Emphasize the steps to perform computation of combined operations.
2. Show students the way to perform computation of combined operations by using Examples 16 to 18.
3. Have students work individually on Questions 1 to 4 in Test Yourself 3.4.
4. Ask students to do the exercises of this subtopic on pages 45 and 46 of the Workbook as their homework.

### **10<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 72.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 73.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 3 Decimals**

**Explanation: Summary of learning outcomes**

Contents that you need for teacher to explain further:

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Feeling after learning this chapter:

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Knowledge gained from this chapter:

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### **Chapter 3 Decimals**

Application of knowledge from this chapter on your daily life:

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Exercises that you like and want to be selected as the outstanding work:

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Contents that you like the most in this chapter (give your reason):

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## Chapter 4 Indices

Indicators and learning areas (21 hours)

Indicators	Learning Areas
M1.1 Gr7/2 Have concept of real numbers expressed in exponential notation with integral indices and write numbers in scientific notation.	<ul style="list-style-type: none"><li>• Indices</li></ul>
M1.2 Gr7/4 Multiply and divide real numbers in the form of exponents with the same bases and integral indices.	<ul style="list-style-type: none"><li>• Multiplication of numbers in index notation</li><li>• Division of numbers in index notation</li><li>• Raising numbers and algebraic terms in index notation to a power</li><li>• Negative integral indices</li><li>• Fractional indices</li><li>• Computation involving laws of indices</li></ul>

## Learning objectives

Students will be taught to:

1. Understand the concept of integral indices.
2. Perform computations involving multiplication and division of integral indices.
3. Raise numbers and algebraic terms in integer indices to a power.
4. Understand negative integral indices.
5. Understand fractional indices.
6. Perform computation involving combined operations of multiplication and division of integral indices.

## Learning Outcomes

Students will be able to:

1. Express repeated multiplication as  $a^n$  and vice versa.
2. Find the value of  $a^n$ .
3. Express numbers in index notation.
4. Perform computations involving multiplication of
  - a. numbers and algebraic terms in index notation with the same base.
  - b. numbers and algebraic terms in index notation with different bases.
5. Perform computation involving division of numbers and algebraic terms expressed in index notation with the same base.
6. Simplify numbers and algebraic terms expressed in index notation raised to a power.
7. Perform computation involving multiplication and division of numbers and algebraic terms expressed in index notation with different bases raised to a power.

8. Perform computation involving combined any of the operations of multiplication, division and raised to a power on numbers and algebraic terms.
9. State  $a^{-n} = 1/(a^n)$  and vice versa.
10. Perform computations involving negative indices and algebraic terms.
11. State  $a^{(1/n)}$  as  $\sqrt[n]{a}$  and vice versa.
12. Find the value  $a^{(1/n)}$ .
13. Perform computation involving multiplication, division and raised to a power or combined operations on several numbers expressed in index notation.

### Learning Areas

- Indices
- Multiplication of numbers in index notation
- Division of numbers in index notation
- Raising numbers and algebraic terms in index notation to a power
- Negative integral indices
- Fractional indices
- Computation involving laws of indices

### Teaching and Learning Activities

#### 1<sup>st</sup> – 2<sup>nd</sup> hours (Indices)

1. Explain the meaning of index and base to students.
2. Teach them how to express repeated multiplication in index notation and vice versa by using Examples 1 and 2.
3. Using Examples 3 and 4, show how to find the values of numbers expressed in index notation and express numbers in index notation.

4. Test students' understanding by having them work on the questions in Test Yourself 4.1.
5. Ask students to do the exercises of this subtopic on page 50 to 51 of the Workbook as their homework.

### **3<sup>rd</sup> – 4<sup>th</sup> hours (Multiplication of numbers in index notation)**

1. Show students how to multiply numbers and algebraic terms in index notation with the same base by using Example 5.
2. Have six volunteers work out the answers for Questions 1 and 2 in Test Yourself 4.2.
3. Then, show them how to multiply numbers and algebraic terms in index notation with different bases by using Example 6.
4. Ask students to work in groups on Questions 3 and 4 in Test Yourself 4.2. Discuss the answers with them.
5. Ask students to do the exercises of this subtopic on page 51 to 52 of the Workbook as their homework.

### **5<sup>th</sup> – 6<sup>th</sup> hours (Division of numbers in index notation)**

1. Show students how to divide numbers and algebraic terms in index notation with the same base by using Example 7.
2. Have four students to work out the answers for the questions in Test Yourself 4.3. Discuss the answers with them.
3. Ask students to do the exercises of this subtopic on page 52 of the Workbook as their homework.

### **7<sup>th</sup> – 9<sup>th</sup> hours (Raising numbers and algebraic terms in index notation to a power)**

1. Show students how to simplify numbers and algebraic terms expressed in index notation raised to a power by using Example 8.

2. Have students work on Questions 1 and 2 in Test Yourself 4.4. Discuss the answers with them.
3. Show students how to simplify multiplication and division of numbers and algebraic terms expressed in index notation raised to a power by using Examples 9 to 10.
4. Have students work on Questions 3 and 6 in Test Yourself 4.4. Discuss the answers with them.
5. Write Questions 7(f) and 8(e) in Test Yourself 4.4 on the board and have two students work on them. Discuss with them how to perform computation on combined operations.
6. Have students work on the rest of the questions individually.
7. Ask students to do the exercises of this subtopic on pages 52 to 54 of the Workbook as their homework.

#### **10<sup>th</sup> – 13<sup>th</sup> hours (Negative integral indices)**

1. Show how to state  $a^{-n}$  to  $1/(a^n)$  and vice versa. Use Examples 13 and 14.
2. Using Example 15, show students how to perform computation of combined operation involving negative indices on numbers and algebraic terms.
3. Test students' understanding by asking them to work on Questions 1 to 4 in Test Yourself 4.5.
4. Ask students to do the exercises of this subtopic on pages 54 and 55 of the Workbook as their homework.

#### **14<sup>th</sup> – 17<sup>th</sup> hours (Fractional indices)**

1. Show how to state  $a^{1/n}$  as  $\sqrt[n]{a}$  and vice versa, using Examples 17 and 18 in the Textbook.
2. Have students try out Questions 1 and 2 in Test Yourself 4.6.

3. Show students how to find the value of  $a^{1/n}$  and state  $a^{m/n}$ . Use Example 19.
4. By using Examples 20 and 21, guide students on how to perform computation on combined operations involving fractional indices on numbers and algebraic terms.
5. Guide them to find value of  $a^{1/n}$ .
6. Have students try out Questions 3 to 8 in Test Yourself 4.6.
7. Ask students to do the exercises of this subtopic on pages 55 and 57 of the Workbook as their homework.

### **18<sup>th</sup> – 20<sup>th</sup> hours (Computation involving laws of indices)**

1. Remind students the laws of indices.
2. Guide them to do computation involving combined operations of numbers and algebraic terms in index notation by using Examples 23 to 25.
3. Have students try out the questions in Test Yourself 4.7.
4. Ask students to do the exercises of this subtopic on page 58 of the Workbook as their homework.

### **21<sup>st</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 95.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 95.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 4 Indices**

**Explanation: Summary of learning outcomes**

**Contents that you need for teacher to explain further:**  
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**Feeling after learning this chapter:**  
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**Knowledge gained from this chapter:**  
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**Contents that you like the most in this chapter (give your reason):**  
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**Exercises that you like and want to be selected as the outstanding work:**  
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**Application of knowledge from this chapter on your daily life:**  
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## Chapter 5 Exponential Notation

Indicators and learning areas (13 hours)

Indicators	Learning Areas
M1.1 Gr7/2 Have concept of real numbers expressed in exponential notation with integer indices and write numbers in scientific notation.	<ul style="list-style-type: none"><li>• Exponential notation</li></ul>
M1.2 Gr7/3 Explain results of expression in exponential notation of integral numbers, ratios and decimals. M1.2 Gr7/4 Multiply and divide real numbers in the form of exponents with the same bases and integer indices.	<ul style="list-style-type: none"><li>• Addition and subtraction in exponential notation</li><li>• Multiplication and division in exponential notation</li><li>• Combined operations using exponential notation</li></ul>

### Learning Objectives

Students will be taught to:

1. Understand the concept of exponential notation.
2. Perform computations involving addition, subtraction, multiplication and division of numbers using exponential notation.
3. Perform computations involving combined operations of addition, subtraction, multiplication and division of numbers using exponential notation to solve problems.

## **Learning Outcomes**

Students will be able to:

1. Understand and write numbers using exponential notation.
2. Perform computation involving addition and subtraction of numbers using exponential notation.
3. Perform computation involving multiplication and division of numbers using exponential notation.
4. Perform computations involving any combination of addition, subtraction, multiplication and division of numbers using exponential notation.
5. Solve problems involving combination of addition, subtraction, multiplication and division of numbers using exponential notation.

## **Learning Areas**

- Exponential notation
- Addition and subtraction in exponential notation
- Multiplication and division in exponential notation
- Combined operations using exponential notation

## **Teaching and Learning Activities**

**1<sup>st</sup> – 2<sup>nd</sup> hours (Exponential notation)**

1. Explain to students what exponential notation is, by using Examples 1 to 3.
2. Test students' understanding by having them to work individually on Test Yourself 5.1.
3. Ask students to do the exercises of this subtopic on page 61 of the Workbook as their homework.

### **3<sup>rd</sup> – 5<sup>th</sup> hours (Addition and subtraction in exponential notation)**

1. Guide students to add and subtract numbers in exponent notation using Examples 4 to 7. Remind them that numbers in exponent notation that have the same power of base 10 can be added or subtracted directly.
2. Test their understanding using the questions in Test Yourself 5.2.
3. Ask students to do the exercises of this subtopic on pages 61 to 63 of the Workbook as their homework.

### **6<sup>th</sup> – 8<sup>th</sup> hours (Multiplication and division in exponential notation)**

1. Guide students to multiply and divide numbers in exponent notation using Examples 8 and 9.
2. Test their understanding using questions in Test Yourself 5.3.
3. Ask students to do the exercises of this subtopic on pages 63 and 64 of the Workbook as their homework.

### **9<sup>th</sup> – 11<sup>th</sup> hours (Combined operations using exponential notation)**

1. Remind students the steps to perform computation involving combined operations.
2. Using Examples 10 and 11, show the steps in detail.
3. Have students work out the questions in Test Yourself 5.4 individually. Discuss the answers with them.
4. Guide students to add and subtract numbers in exponent notation using Examples 4 to 7. Remind them that the numbers in exponent notation that have same power of base 10 can be added or subtracted directly.
5. Test their understanding using questions in Test Yourself 5.2.
6. Ask students to do the exercises of this subtopic on pages 64 to 65 of the Workbook as their homework.

## **12<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 108.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 109.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

## **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

## **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

Name-Surname: .....

No. ....

Mathayom: .....

Date: .....

### Chapter 5 Exponential Notation

Explanation: Summary of learning outcomes

Contents that you need for teacher to explain further:  
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Feeling after learning this chapter:  
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Knowledge gained from this chapter:  
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Chapter 5 Exponential Notation

Contents that you like the most in this chapter (give your reason):  
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Exercises that you like and want to be selected as the outstanding work:  
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Application of knowledge from this chapter on your daily life:  
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## Chapter 6 Geometrical Constructions

Indicators and learning areas (15 hours)

Indicators	Learning Areas
M3.1 Gr7/1 Construct and explain steps of basic geometric construction.	• Construction
M3.1 Gr7/2 Construct two-dimensional geometric figures by using basic geometric construction, and explain steps of construction without emphasizing proof.	

### Learning Objectives

Students will be taught to:

1. Construct basic geometric construction.
2. Construct two-dimensional geometric figures using basic geometric construction.
3. Explain the steps taken.

### Learning Outcomes

Students will be able to:

1. Construct
  - a. line segments
  - b. triangles of given sides
  - c. perpendicular lines
  - d. angles and angle bisectors
  - e. triangles of given sides and angles
  - f. parallel lines
2. Explain the steps taken.

### Learning Areas

- Construction

## **Teaching and Learning Activities**

### **1<sup>st</sup> – 14<sup>th</sup> hours (Construction)**

1. Introduce to students ruler, compasses and set square.
2. Teach and guide students on how to construct
  - a. line segments
  - b. triangles of given sides
  - c. perpendicular lines
  - d. angles and angle bisectors
  - e. triangles of given sides and angles
  - f. parallel lines
3. Explain each step to construct the geometrical figures as students carry out the steps accordingly. Make sure they have a set of the tools of their own and draw on a big piece of blank paper.
4. Use Examples 1 to 14. Have them try out the questions in Test Yourself 6.1 as they progress. Explain the notes in the Hot Tips columns to make them understand better.
5. Ask students to do the exercises of this subtopic on pages 68 to 73 of the Workbook as their homework.

### **15<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 129.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 130.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.

5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill
4. Drawing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 6 Geometrical Constructions**

**Explanation: Summary of learning outcomes**

**Chapter 6 Geometrical Constructions**

Feeling after learning this chapter:  
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Contents that you need for teacher to explain further:  
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Knowledge gained from this chapter:  
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Contents that you like the most in this chapter (give your reason):  
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Exercises that you like and want to be selected as the outstanding work:  
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Application of knowledge from this chapter on your daily life:  
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## Chapter 7 Solid Geometry

### Indicators and learning areas (10 hours)

Indicators	Learning Areas
M3.1 Gr7/4 Explain characteristics of three-dimensional geometric figures from a given image.	• Cubes and cuboids
M3.2 Gr7/5 Identify two-dimensional images from front view and side view of a given three-dimensional geometric figure.	• Plan, front elevation and side elevation of 3D geometrical shapes
M3.2 Gr7/6 Draw or create a three-dimensional figure from a cube, when given two-dimensional image from front view, side view and top view.	

### Learning Objectives

Students will be taught to:

1. Explain the geometrical properties of cubes and cuboids.
2. Identify two-dimensional images from the top view, front elevation view and side view of a given three-dimensional geometrical shapes.
3. Create a three-dimensional figure when given two-dimensional images from its top view, front elevation view and side view.

### Learning Outcomes

Students will be able to:

1. Explain the geometrical properties of cube and cuboids.
2. Draw cubes and cuboids on square grids and blank paper.
3. Identify two-dimensional images from the top view, front elevation view and side view of a given three-dimensional geometrical shapes.
4. Identify three-dimensional geometrical shapes composed of cube from the two-dimensional images from the top view, front elevation view and side view of the given shapes.

## Learning Areas

- Cubes and cuboids
- Plan, front elevation and side elevation of 3-D geometrical shapes

## Teaching and Learning Activities

### **1<sup>st</sup> hour (Cubes and cuboids)**

1. Show students the characteristics of cubes and cuboids. Guide them on how to draw these figures.
2. Test students' understanding using Test Yourself 7.1.
3. Ask students to do the exercises of this subtopic on pages 76 to 77 of the Workbook as their homework.

### **2<sup>nd</sup> – 9<sup>th</sup> hours (Plan, front elevation and side elevation of 3-D geometrical shapes)**

1. Using some 3-D block models, explain plan, front elevation and side elevation of the model. Ask students to draw the views on paper.
2. Using Examples 1 to 3, help students to imagine and draw the plans, front elevations and side elevations of the figures.
3. Test their understanding by asking them to work on Questions 1 and 2 in Test Yourself 7.2.
4. Ask students to do the exercises 1 and 2 on pages 78 and 79 of the Workbook as their homework.
5. Using small cubes, compose some geometrical shapes and explain how to imagine and draw the plans, front elevations and side elevations of the figures with the depths indicated.
6. Explain and guide students with Examples 4 and 5 in the Textbook.
7. Test their understanding by asking them to work on Questions 3 and 4 in Test Yourself 7.2.

8. Ask students to do the exercises 3 and 4 on pages 80 and 81 of the Workbook as their homework.

### **10<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 149.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 150.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill
4. Drawing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1
- 3-D block
- Small cubes



## Learning Outcome Form

**Name-Surname:** .....

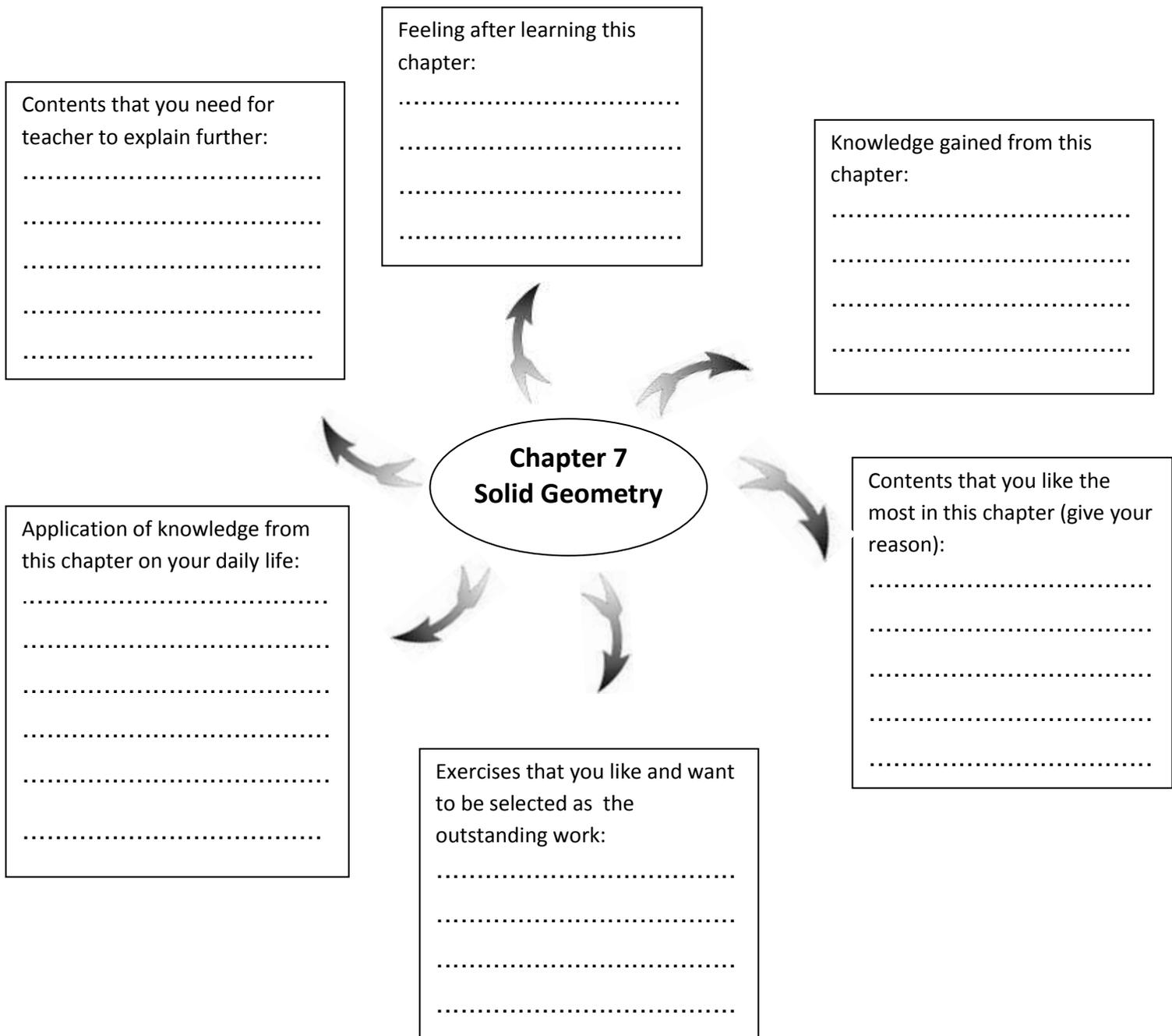
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**Mathayom:** .....

**Date:** .....

### **Chapter 7 Solid Geometry**

**Explanation: Summary of learning outcomes**



## Chapter 8 Linear Equations

Indicators and learning areas (11 hours)

Indicators	Learning Areas
M4.2 Gr7/2 Write linear equations with one variable from simple situations or problems.	<ul style="list-style-type: none"><li>• Equality</li></ul>
M4.2 Gr7/1 Solve simple linear equations with one variable.  M4.2 Gr7/3 Solve problems involving simple linear equations with one variable, as well as be aware of the validity of the answer.	<ul style="list-style-type: none"><li>• Linear equations in one unknown</li><li>• Solutions of linear equations in one unknown</li></ul>

### Learning Objectives

Students will be taught to:

1. Understand and state the relationship between two quantities using the symbol '=' or '≠'.
2. Understand the concept of linear algebraic terms, linear algebraic expressions and linear equations.
3. Understand and write linear equations in one unknown.
4. Perform the concept of linear equation in one unknown to solve problems.
5. Aware of the validity of the answers.

### Learning Outcomes

Students will be able to:

1. Understand and state the relationship between two quantities using the symbol '=' or '≠'.

2. Determine algebraic terms, linear algebraic expressions and linear equations.
3. Write equations in one unknown for given statements and vice versa.
4. Determine if an integer is a solution of a given linear equation in one unknown.
5. Determine the solution of a linear equation in one unknown by trial and improvement method.
6. Solve equations in the form of
  - a.  $x + a = b$
  - b.  $x - a = b$
  - c.  $ax = b$
  - d.  $\frac{x}{a} = b$
  - e.  $ax + b = c$
7. Solve linear equations in one unknown.
8. Solve problems involving linear equations in one unknown.

### Learning Areas

- Equality
- Linear equations in one unknown
- Solution of linear equations in one unknown

### Teaching and Learning Activities

#### 1<sup>st</sup> – 2<sup>nd</sup> hours (Equality)

1. Explain the meaning of equality using the symbol '=' and '≠' using Examples 1 and 2.
2. Test their understanding by asking them to work on Questions 1 to 4 in Test Yourself 8.1.
3. Ask students to do the questions in this subtopic 4 on page 85 of the Workbook as their homework.

### **3<sup>rd</sup> – 6<sup>th</sup> hours (Linear equations in one unknown)**

1. Explain the meaning of linear algebraic term, linear algebraic expression, linear equation and linear equation in one unknown using Examples 4 to 6.
2. Test their understanding using Questions 1 to 4 in Test Yourself 8.2.
3. Guide students on how to write linear equations in one unknown for given statements and vice versa.
4. Test their understanding by asking them to work on Questions 3 and 4 in Test Yourself 8.2.
5. Ask students to do the exercises in this subtopic on pages 85 to 87 of the Workbook as their homework.

### **7<sup>th</sup> – 10<sup>th</sup> hours (Solutions of linear equations in one unknown)**

1. Explain using Example 10 how to determine if a number is a solution of a given linear equation in one unknown.
2. Have three students try Questions 1(a), 1(c) and 1(f) in Test Yourself 8.3. Discuss the answers with them.
3. Also show them how to use trial and improvement method to determine the solution of a linear equation with one unknown by using Example 11.
4. By using Examples 12 to 16, guide students on how to solve linear equations in one unknown.
5. Test their understanding by having them to work out Questions 3 to 10 in Test Yourself 8.3.
6. Guide students to solve problems involving linear equations in one unknown by using Examples 17 and 18.
7. Have seven volunteers to solve problems in Questions 11 and 12 in Test Yourself 8.3.

8. Ask students to do the exercises in this subtopic on pages 87 to 91 of the Workbook as their homework.

### **11<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 170.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 171.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

**Name-Surname:** .....

**No.** .....

**Mathayom:** .....

**Date:** .....

### **Chapter 8 Linear Equations**

**Explanation: Summary of learning outcomes**

**Contents that you need for teacher to explain further:**  
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**Feeling after learning this chapter:**  
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**Knowledge gained from this chapter:**  
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**Chapter 8  
Linear Equations**

**Contents that you like the most in this chapter (give your reason):**  
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**Application of knowledge from this chapter on your daily life:**  
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**Exercises that you like and want to be selected as the outstanding work:**  
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## Chapter 9 Relations, Coordinates and Line Graphs

Indicators and learning areas (10 hours)

Indicators	Learning Areas
M4.2 Gr7/4 Draw a graph on the plane of the rectangular coordinate system showing the relationship of the two sets of quantities given.	<ul style="list-style-type: none"><li>• Relations</li><li>• Coordinates</li></ul>
M4.2 Gr7/5 Read and interpret the meaning of the graph on the plane of the rectangular coordinate system given.	<ul style="list-style-type: none"><li>• Scales of the coordinate axes</li><li>• Line graphs</li></ul>

### Learning Objectives

Students will be taught to:

1. Understand set notation, arrow diagram, set of ordered pair and graph.
2. Understand, plotting and stating the coordinates on a Cartesian plane.
3. Understand the scales of the coordinate axes.
4. Solve problems involving coordinates.
5. Understand, construct and interpret line graphs.

### Learning Outcomes

Students will be able to:

1. Understand set notation, arrow diagram, set of ordered pair and graph.
2. Understand the meaning of domain, codomain, object, image and range of a relation.
3. State the types of relations.
4. Plot points and state the coordinates of the points, given the distances from the y-axis and x-axis.

5. Plot points and state the distances of points from the  $y$ -axis and  $x$ -axis, given the coordinates of the points.
6. State the coordinates of points on a Cartesian plane.
7. Mark the values on both axes by extending the sequence of the given value on the respective axes.
8. State the scales used in the given coordinate axes.
9. Mark the values on both axes with reference to the scales given.
10. State the coordinates of a given point with reference to the scales given.
11. Plot points given the coordinates with reference to the scales given.
12. Solve problems involving coordinates.
13. Construct line graphs.
14. Read and interpret line graphs.

### Learning Areas

- Relations
- Coordinates
- Scales of the coordinate axes
- Line graphs

### Teaching and Learning Activities

#### **1<sup>st</sup> – 2<sup>nd</sup> hours (Relations)**

1. Introduce set notation to students by using Example 1.
2. Have them try out Question 1 in Test Yourself 9.1.
3. Explain a relation that can be represented using an arrow diagram, a set of ordered pair and a graph. Use Example 2 for better explanation.
4. Have them try out Question 2 in Test Yourself 9.1.
5. Explain the types of relation using Example 4.
6. Then, have a volunteer try out Question 4 in Test Yourself 9.1.
7. Ask students to do the exercises in this subtopic on pages 94 to 97 of the Workbook as their homework.

### **3<sup>rd</sup> – 4<sup>th</sup> hours (Coordinates)**

1. Explain the axes in a Cartesian plane by using Example 5.
2. Have two volunteers try out Question 1 Test Yourself 9.2.
3. Guide students to plot points and state the coordinates of the points and state the distances of points from the axes in various situations. Use Examples 6 and 7 as examples.
4. Test students' understanding by asking them to work out Questions 2 and 3 in Test Yourself 9.2.
5. Explain the differences of coordinates in different quadrant of a Cartesian plane. Use Examples 8 and 9.
6. Then, have students work Questions 4 and 5 in Test Yourself 9.2.
7. Ask students to do the exercises in this subtopic on pages 98 to 100 of the Workbook as their homework.

### **5<sup>th</sup> – 6<sup>th</sup> hours (Scales of the coordinate axes)**

1. Using Examples 10 to 12, guide students to mark the values on the axes and state the scales used.
2. Test their understanding by asking them to work on Questions 1 to 3 in Test Yourself 9.3.
3. Guide students to state the coordinates of given points and plot the points of given coordinates with reference to the scales given.
4. Test their understanding by asking them to work on Questions 4 to 5 in Test Yourself 9.3.
5. Using Example 15, help students to solve that problem.
6. Have two volunteers solve problems in Questions 6 and 7 in Test Yourself 9.3.
7. Ask students to do the exercises in this subtopic on pages 100 to 106 of the Workbook as their homework.

### **7<sup>th</sup> – 9<sup>th</sup> hours (Line graph)**

1. Using Example 17, guide students to construct line graphs based on given information.
2. Have two volunteers work on Questions 1 and 2 in Test Yourself 9.4.
3. Using Example 18, guide students to read and interpret given line graphs.
4. Have two volunteers work on Questions 3 and 4 in Test Yourself 9.4.
5. Ask students to do the exercises in this subtopic on pages 106 to 110 of the Workbook as their homework.

### **10<sup>th</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 197.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 198.
4. Randomly select 5 objective questions and 5 subjective questions from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1
- Graph paper



## Learning Outcome Form

**Name-Surname:** ..... **No.** .....

**Mathayom:** ..... **Date:** .....

### **Chapter 9 Relations, Coordinates and Line Graphs**

#### **Explanation: Summary of learning outcomes**

**Contents that you need for teacher to explain further:**  
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**Feeling after learning this chapter:**  
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**Knowledge gained from this chapter:**  
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**Chapter 9  
Relations,  
Coordinates and Line  
Graphs**

**Contents that you like the most in this chapter (give your reason):**  
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**Exercises that you like and want to be selected as the outstanding work:**  
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**Application of knowledge from this chapter on your daily life:**  
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## Chapter 10 Probability

Indicators and learning areas (3 hours)

Indicators	Learning Areas
M5.2 Gr7/1 Can explain which, among events described, are more likely to happen.	• Probability

### Learning Objectives

Students will be taught to:

1. Explain the meaning of probability.
2. Use probability scales.

### Learning Outcomes

Students will be able to:

1. Determine the probabilities of some events.
2. Use probability scales.

### Learning Areas

- Probability

### Teaching and Learning Activities

1<sup>st</sup> – 2<sup>nd</sup> hours (Probability)

1. Use variety of situations to explain probability. Ask students for three other examples of events that are certain, have even chance and are impossible respectively.
2. You may use Example 1.
3. Use Examples 2 and 3 to guide students on probability scales.
4. Test their understanding by asking them to work on Questions 1 to 3 in Test Yourself 10.1.

5. Ask students to do the exercises in this subtopic on pages 113 to 115 of the Workbook as their homework.

### **3<sup>rd</sup> hour (Conclusion)**

1. Explain the mistakes shown in the Common Mistake column on page 207.
2. Ensure students understand the terms used in this chapter by referring to the Mathematical Terms column.
3. Revise the lesson using the Quick Revision column on page 208.
4. Randomly select 5 objective questions and 1 subjective question from the Mastery Practice in the Textbook and have students solve them in the class. Have students work on the rest of the questions at home.
5. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

### **Emphasized Characteristics**

1. Thinking skill
2. Problem-solving skill
3. Analysing skill

### **Learning Materials**

- Focus Smart Textbook Mathematics M1
- Focus Smart Workbook Mathematics M1



## Learning Outcome Form

Name-Surname: .....

No. ....

Mathayom: .....

Date: .....

### Chapter 10 Probability

Explanation: Summary of learning outcomes

Feeling after learning this chapter:  
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Contents that you need for teacher to explain further:  
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Knowledge gained from this chapter:  
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Chapter 10 Probability

Contents that you like the most in this chapter (give your reason):  
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Application of knowledge from this chapter on your daily life:  
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Exercises that you like and want to be selected as the outstanding work:  
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Notes: Strand 6: Mathematical Skills and Processes is inculcated in all the chapters appearing in the textbook and workbooks of Primary Education Plus Series. Through them, students will learn to:

- ❖ Apply diverse methods for problem-solving.
- ❖ Appropriately apply mathematical knowledge, skills and processes for problem-solving in various situations
- ❖ . Suitably provide reasoning for decision-making and appropriately present the conclusions reached.
- ❖ Accurately use mathematical language and symbols for communication of concepts and presentation.
- ❖ Link various bodies of mathematical knowledge, and link mathematics with other disciplines.
- ❖ Attain ability for creative thinking.