



Teacher's Guide



MATHEMATICS



3

Mathayom



Based on the Basic Education Curriculum B.E. 2551
(Revised Edition B.E. 2560)

Preface

Why do we have to learn mathematics?

In the 21st century learning, mathematics plays an important role because mathematics helps people to have creative, reasoning and systematic thinking mind and enables people to analyze problems or situations considerably. As a result, they can predict, plan, decide and solve real life problems appropriately, practically and efficiently. Mathematics is also a tool in the study of science, technology and other disciplines, besides being a fundamental of human resource development. In order to develop our country's economy on a par with other countries, the learning of mathematics needs to be updated progressively and accords fully with the current social and economic conditions while the knowledge of advanced science and application of technology must progress fast in the globalized world.

The Basic Education Curriculum B.E. 2551 (Revised Edition B.E. 2560) ensures students to have the skills they need for the 21st century workplace which includes analytical thinking skills, critical thinking skills, creative thinking skills, problem-solving skills, the skills of using technology and communication and collaboration. Consequently, students need to be competitive in order to live in the borderless society due to the changes in the global economy, culture and environment.

A successful mathematics education needs to prepare students for learning new things and life after graduation or furthering their study in higher levels. Therefore, schools should provide the appropriate learning environment according to students' ability.

General learning outcomes in each strand

The subject of mathematics is divided into three strands namely numbers and algebra, measurement and geometry, and statistics and probability.

- **Numbers and algebra**

Learning about the real number system, the properties of numbers, ratios, percentages, estimation, problem-solving involving numbers, the application of real numbers in real life, patterns, the relation of functions and set, logic, expressions, monomial, polynomials, equations, equation systems and inequality, graphs, the interest and values of money, sequences and series, and the application of the knowledge of numbers and algebra in various situations.

- **Measurement and geometry**

Learning about length, distance, weight, area, volume, capacity, money, time, measuring units, estimation for measurements, trigonometric ratios, geometric figures, visualization of geometric models, geometric theories, geometric transformation through translation, reflection and rotation, and the application of the knowledge of measurement and geometry in various situations.

- **Statistics and probability**

Learning about statistical enquiries, data collection, statistic calculations, presentation and interpretation of qualitative and quantitative data, the fundamental of counting principles, probability, the application of the knowledge of statistics and probability in explaining various situations as well as for facilitating decision-making in real life.

Strands and Learning Standards

Strand 1: Numbers and Algebra

- Standard M1.1: Understand various ways of numbers presentations, number systems, number operations, the results of number operations and the properties of operations.
- Standard M1.2: Understand and analyze patterns, relations, functions, sequences and series and application.
- Standard M1.3: Use expressions, equations, inequalities and explanation of relations to solve problems.

Strand 2: Measurement and Geometry

- Standard M2.1: Understand the fundamentals of measurements and measure, estimate the sizes of objects and apply them in solving problems.
- Standard M2.2: Understand and analyze geometric figures, the properties of geometric figures, the relationships between geometric figures and geometric theories, and apply them in solving problems.

Strand 3: Statistics and Probability

- Standard M3.1: Understand the statistical processes and apply them to solve problems.
- Standard M3.2: Understand the fundamental counting principles, probability and apply them to solve problems.

Mathematical Skills and Processes

Mathematical skills and processes include the ability of applying the knowledge while learning other subjects in order to gain knowledge and apply it in daily life efficiently. Skills and processes in mathematics as mentioned above focus particularly on the essential ones that need to be developed in learners' abilities as followings:

1. **Problem-solving** is the ability to understand, analyze, plan and solve the problems, as well as to choose the appropriate methods with considerations for the reasoning and validity of the answers.
2. **Mathematical communication and representation** are the abilities to use mathematical language and symbols in communication, presentation and summary accurately and clearly.
3. **Connection** is the ability to use the knowledge of mathematics as a tool in learning mathematics and other disciplines and connect the mathematical knowledge with the real-world situations.
4. **Reasoning** is the ability to give and explain reasons and proofs behind a solution or choice of strategy to a problem and make and investigate mathematical conjectures.
5. **Creative thinking** is the ability to enhance the previous known concept or create new concepts to improve and develop the knowledge further.

Learners' Quality of Grade 9 students

- Have knowledge and understanding of the real numbers, the relationships of real numbers, the properties of real numbers, and apply them to solve real life problems.
- Have knowledge and understanding of proportions and percentages, and apply them to solve real life problems.
- Have knowledge and understanding of exponents with whole number power and apply them to solve real life problems.
- Have knowledge and understanding of linear equations with one variable, the systems of linear equations with two variables, and linear inequalities with one variable, and apply them to solve real life problems.
- Have knowledge and understanding of ordered pairs, graph relationships and quadratic functions, and apply them to solve real life problems.
- Have knowledge and understanding of geometry and geometric tools, for example compass and ruler including the Geometer's Sketchpad Program or other dynamic geometry programs in order to create geometric figures as well as apply them to solve real life problems.
- Have knowledge and understanding of two and three-dimensional geometric figures and use them to find the relationship between two-dimensional geometric figures and three-dimensional geometric figures.
- Have knowledge and understanding of the surface area and the volume of prisms, cylinders, pyramids, cones and spheres as well as apply them to solve real life problems.
- Have knowledge and understanding of the properties of parallels, congruence and similarities of triangles, Pythagoras' theorems and converse as well as apply them to solve real life problems.
- Have knowledge and understanding of transformations and apply them to solve real life problems.
- Have knowledge and understanding of the trigonometric ratios and apply them to solve real life problems.
- Have knowledge and understanding of circle theorems and apply them to solve mathematical problems.

- Have knowledge and understanding of statistics in the presentation, data analysis, data interpretation related to dot diagrams, tree diagrams, histograms, box diagrams and mean as well as apply them including statistics to real life with the use of appropriate technology.
- Have knowledge and understanding of probability and apply them to solve real life problems.

Yearly Teaching Plan

Mathematics

Grade 9 (Mathayom 3)

11 chapters

120 hours

Learning area	Duration (hours)
1. Linear Inequalities <ul style="list-style-type: none">• Inequality• Linear inequalities in one variable• Performing computation on inequalities• Solving inequalities in one variable• Systems of linear inequalities in one variable	18
2. Quadratic Equations in One Variable <ul style="list-style-type: none">• Quadratic equations• Roots of quadratic equations in one variable	9
3. Systems of Linear Equations <ul style="list-style-type: none">• Systems of linear equations in two variables• Solving problems involving systems of linear equation in two variables	7
4. Quadratic Functions <ul style="list-style-type: none">• Quadratic functions and their graphs• Maximum and minimum values of quadratic functions• Sketching graphs of quadratic functions	9

<p>5. Factorization of Polynomials</p> <ul style="list-style-type: none"> • Factorizing using the Special Product Method • Factorizing using the Highest Common Factor (HCF) • Factorizing using the Grouping Method • Factorizing using the Synthetic Division Method 	11
<p>6. Surface Areas and Volumes of Pyramids, Cones and Spheres</p> <ul style="list-style-type: none"> • Surface Areas of Pyramids, Cones and Spheres • Volumes of Pyramids, Cones and Spheres 	11
<p>7. Similarity</p> <ul style="list-style-type: none"> • Scale Drawings • Similar Triangles 	10
<p>8. Trigonometric Ratios</p> <ul style="list-style-type: none"> • Tangent • Sine • Cosine • Values of Tangent, Sine and Cosine 	14
<p>9. Circles</p> <ul style="list-style-type: none"> • Parts of a Circle • Angles in a Circle • Cyclic Quadrilaterals • Angles between Tangents and Cords 	13

10. Box Plots <ul style="list-style-type: none"> • Constructing Box Plots • Interpreting Box Plots 	6
11. Probability <ul style="list-style-type: none"> • Events and Outcomes • Probability • Outcomes from Independent Events 	12

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 – Linear Inequalities (18 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
<p>Standard M. 1.3:</p> <p>1. Understand and apply the properties of inequality to analyze and solve problems using linear inequality in one variable.</p>	<ul style="list-style-type: none">• Inequality• Linear inequalities in one variable• Performing computation on inequalities• Solving inequalities in one variable• Systems of linear inequalities in one variable

Learning Objectives

Students will be taught to:

1. Understand what inequalities are.
2. Understand what linear inequalities in one variable are.
3. Perform computation on inequalities.
4. Solve inequalities in one variable.
5. Understand systems of linear inequalities in one variable

Learning Outcomes

Students will be able to:

1. Identify the relationship ‘greater than’, ‘greater than or equal to’, ‘less than’ and ‘less than or equal to’.
2. Determine if a given relationship is a linear inequality in one variable.
3. Determine the possible solutions for a given linear inequality in one variable.
4. Represent a linear inequality on a number line and vice versa.
5. Construct linear inequalities.
6. Perform computation on inequalities.
7. Construct inequalities from given information.
8. Solve a linear inequality in one variable by adding or subtracting a number.
9. Solve a linear inequality in one variable by multiplying or dividing a number.
10. Solve linear inequalities in one variable using a combination of operations.
11. Represent the common values of a system of linear inequalities on a number line.
12. Determine the equivalent inequalities for two given linear inequalities.
13. Solve a system of linear inequalities.

Learning Areas

- Inequalities
- Linear inequalities in one variable
- Performing computation on inequalities
- Solving inequalities in one variable
- Systems of linear inequalities in one variable

Teaching and Learning Activities

1st – 3rd hours (Inequality)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Remind students of the relation ‘greater than’ and ‘less than’. Use Examples 1 and 2 for further explanation.
3. Test their understanding by asking them to try Questions 1 and 2 in Test Yourself 1.1.
4. Remind students of the relation ‘greater than or equal to’ and ‘less than or equal to’. Use Example 3 for further explanation.
5. Test their understanding by asking them to try Question 3 in Test Yourself 1.1.
6. Have students work on Questions 1 to 3 on pages 2 and 3 of the Workbook as their homework.

4th – 7th hours (Linear Inequalities in One Variable)

1. Explain what a linear inequality in one variable is. Use Example 4 for further explanation.
2. Ask them to try Question 1 in Test Yourself 1.2.
3. Guide students to determine the possible solutions for a given linear inequality in one variable using Example 5.
4. Have four volunteers try Question 2 in Test Yourself 1.2.
5. Have students work on Questions 1 and 2 on pages 3 and 4 in the Workbook as their homework.
6. Guide students to represent a linear inequality on a number line and vice versa using Examples 6 and 7.
7. Have eight students to try Questions 3 and 4 in Test Yourself 1.2. Discuss the answers with them.
8. Using Example 8, show students how to construct linear inequalities.
9. Have four volunteers try Question 5 in Test Yourself 1.2.

10. Have students to work on Questions 3 to 5 on pages 4 and 5 of the Workbook as their homework.

8th – 10th hours (Performing Computation on Inequalities)

1. Guide students to add and subtract a number from both sides of an inequality using Example 9.
2. Have students try Questions 1 and 2 in Test Yourself 1.3.
3. Guide students to multiply and divide both sides of an inequality by a number, using Example 10.
4. Have students try Questions 3 and 4 in Test Yourself 1.3.
5. Using Examples 11 and 12, show students how to construct inequalities from given information.
6. Have three volunteers try Questions 5 to 7 in Test Yourself 1.3. Discuss the answers with them.
7. Have students work on Questions 1 to 5 on pages 5 to 7 of the Workbook as their homework.

11th – 14th hours (Solving Inequalities in One Variable)

1. Guide students to solve linear inequalities in one variable by adding or subtracting a number. Use Example 13 for further explanation.
2. Test their understanding by asking them to try Questions 1 and 2 in Test Yourself 1.4.
3. Using Examples 14 and 15, show students how to solve linear inequalities in one variable by multiplying or dividing a number.
4. Have a few volunteers try Questions 3 and 4 in Test Yourself 1.4.
5. Guide students to solve linear inequalities in one variable using a combination of operations. Use Examples 16 and 17 for further explanation.
6. Get a few students to try Questions 5 and 6 in Test Yourself 1.4.
7. Have students work on Questions 1 to 3 on pages 8 and 9 of the Workbook as their homework.

15th – 17th hours (Systems of Linear Inequalities in One Variable)

1. Guide students to represent the common values of a system of linear inequalities on a number line. Use Example 18 for further explanation.
2. Have six students try Question 1 in Test Yourself 1.5.
3. Have students work on Question 1 on page 10 of the Workbook as their homework.
4. Using Examples 19 and 20, guide students to determine the equivalent inequalities for two given linear inequalities.
5. Test their understanding by asking them to try Question 2 in Test Yourself 1.5.
6. Guide students to solve a system of linear inequalities. Use Examples 21 and 22 for further explanation.
7. Ask students to try Questions 3 and 4 in Test Yourself 1.5.
8. Have students work on Questions 2 and 3 on pages 10 to 12 of the Workbook as their homework.

18th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 22.
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 23.
4. Encourage them to try the QR Quiz on page 23 by scanning the QR code.
5. Ask 2 students to work out the Spot the Errors on page 12 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 1 Linear Inequalities

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 1 Linear Inequalities

Application of knowledge from this chapter on your daily life:

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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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Chapter 2 – Quadratic Equations in One Variable (9 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.3: 1. Apply quadratic equations in one variable to solve mathematical problems.	<ul style="list-style-type: none">• Quadratic equations• Roots of quadratic equations in one variable

Learning Objectives

Students will be taught to:

1. Understand the concept of quadratic equations.
2. Understand the roots of quadratic equations.
3. Use the concept of the roots of quadratic equations to solve problems.

Learning Outcomes

Students will be able to:

1. Identify quadratic equations in one variable.
2. Write quadratic equations in general form.
3. Form quadratic equations based on situations.
4. Determine if a given value is a root of a quadratic equation.
5. Find the roots of quadratic equations by the trial and error method.
6. Find the roots of quadratic equations by factorization.
7. Solve problems involving quadratic equations.

Learning Areas

- Quadratic Equations
- Roots of Quadratic Equations in One Variable

Teaching and Learning Activities

1st – 3rd hours (Quadratic Equations)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Using Example 1, show students how to identify quadratic equations in one variable.
3. Test students' understanding by asking them to do Question 1 in Test Yourself 2.1.
4. Guide students to write quadratic equations in the general form using Example 2.
5. Have students to do Question 2 in Test Yourself 2.1 in the class.
6. Show students to form a quadratic equation based on a specific situation using Example 3.
7. Let students to do Questions 3 and 4 in Test Yourself 2.1.
8. Ask students to do the exercises on pages 16 and 17 of the Workbook as their homework.

4th – 8th hours (Roots of Quadratic Equations in One Variable)

1. Explain what a root of quadratic equation in one variable is. Use Example 4 for further explanation.
2. Ask them to try Question 1 in Test Yourself 2.2.
3. Guide students to find the roots of quadratic equations by the trial and error method using Examples 5 and 6.
4. Have four volunteers try Question 2 in Test Yourself 2.2.

5. Have students work on Questions 1 and 2 on pages 18 and 19 in the Workbook as their homework.
6. Guide students to find the roots of quadratic equations by factorization using Example 7.
7. Have students to try Question 3 in Test Yourself 2.2. Discuss the answers with them.
8. Using Example 8, show students how to solve problems involving quadratic equations.
9. Have three volunteers try Questions 4 to 6 in Test Yourself 2.2.
10. Have students to work on Questions 3 and 4 on pages 19 and 20 of the Workbook as their homework.

9th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 36.
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 37.
4. Encourage them to try the QR Quiz on page 37 by scanning the QR code.
5. Ask 2 students to work out the Spot the Errors on page 21 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

1. Critical thinking skill
2. Problem-solving skill
3. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 2 Quadratic Equations in One Variable

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 2
Quadratic Equations
in One Variable**

Application of knowledge from this chapter on your daily life:

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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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Chapter 3 – Systems of Linear Equations (7 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.3: 1. Apply systems of linear equations in two variables to solve mathematical problems.	<ul style="list-style-type: none">• Systems of linear equations in two variables• Solving problems involving systems of linear equations in two variables

Learning Objectives

Students will be taught to:

1. Understand systems of linear equations.
2. Solve systems of linear equations with two variables which can be applied for problem-solving as well as be aware of the validity of the answer.

Learning Outcomes

Students will be able to:

1. Understand systems of linear equations in two variables.
2. Solve systems of linear equations with two variables.

Learning Areas

- Systems of linear equations in two variables

Teaching and Learning Activities

1st – 3rd hours (Systems of Linear Equations in Two Variables)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Explain how to determine if each pair of equations is a system of linear equations in two variables using Example 1.
3. Test students' understanding by asking them to do Question 1 in Test Yourself 3.1.
4. Using Example 2, guide students to solve a system of linear equations in two variables by the substitution method.
5. Have students to do Question 2 in Test Yourself 3.1. Discuss the answers with them.
6. Using Example 3, guide students to solve a system of linear equations in two variables by the elimination method.
7. Spend time with students to solve Questions 3 and 4 in Test Yourself 3.1.
8. Ask students to work on the exercises in this subtopic on pages 24 to 27 of the Workbook as their homework.

4th – 6th hours (Solving Problems Involving Systems of Linear Equations in Two Variables)

1. Using Examples 5 and 6, guide students on how to solve problems involving a system of linear equations in two variables.
2. Test students' understanding by asking them to do Questions 1 to 7 in Test Yourself 3.2. Discuss the answers with them.
3. Let students to work on the exercises in this subtopic on pages 28 and 29 of the Workbook as their homework.

7th hour (Conclusion)

1. Explain the mistake shown in the Common Mistakes column on page 46.
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 47.
4. Encourage them to try the QR Quiz on page 47 by scanning the QR code.
5. Ask two students to work out the Spot the Errors on page 30 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. Let 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 3 Systems of Linear Equations

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 3
Systems of Linear
Equations**

Application of knowledge from this chapter on your daily life:

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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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Chapter 4 – Quadratic Functions (9 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.2: 1. Understand and use knowledge of quadratic functions to solve mathematical problems.	<ul style="list-style-type: none">• Quadratic functions and their graphs• Maximum and minimum values of quadratic functions• Sketching graphs of quadratic functions

Learning Objectives

Students will be taught to:

1. Understand quadratic functions and their graphs.
2. Find the maximum and minimum points of quadratic functions.
3. Sketch graphs of quadratic functions.

Learning Outcomes

Students will be able to:

1. Understand what a quadratic function is.
2. Plot graphs of quadratic functions.
3. State the relation between the positions of the graph of quadratic function and the types of roots.
4. Sketch a graph of a quadratic function.

Learning Areas

- Quadratic functions
- Graphs of quadratic functions

Teaching and Learning Activities

1st – 3rd hours (Quadratic Functions)

1. Let students to do the Flashback to help them recall certain Mathematical concepts.
2. Explain the general form of a quadratic function. Use Example 1 for further explanation.
3. Have students try Question 1 in Test Yourself 4.1.
4. Using Example 2 to describe the shape of the graphs. Let students to do Question 2 in Test Yourself 4.1.
5. Guide students to plot graphs of quadratic functions using Examples 3 and 4. Try Questions 3 and 4 in Test Yourself 4.1.
6. State the relation between the positions of the graph of quadratic function and the types of roots. Use Examples 5 to 8 for further explanation.
7. Test their understanding by asking to try Questions 5 to 8 in Test Yourself 4.1. Discuss the answers with them.
8. Have students work on questions on pages 34 to 37 of the Workbook as their homework.

4th – 6th hours (Maximum and Minimum Values of Quadratic Functions)

1. Guide students to determine the maximum and minimum value of the quadratic function using the square method. Use Example 9 for further explanation.
2. Have students try Question 1 in Test Yourself 4.2.

3. Use Example 10 to find the possible values of an unknown if the minimum value of the quadratic function is given. Test their understanding by asking to try Questions 2 to 4 in Test Yourself 4.2. Discuss the answers with them.
4. Have students work on Questions 1 and 2 on pages 38 and 39 of the Workbook as their homework.

7th – 8th hours (Sketching Graphs of Quadratic functions)

1. Guide students on how to sketch a graph of a quadratic function.
2. Use Example 11 to explain the steps to sketch graphs of the quadratic functions.
3. Have students try Question 1 in Test Yourself 4.3.
4. Have students work on Questions on pages 40 and 41 of the Workbook as their homework.

9th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 61.
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 62.
4. Encourage them to try the QR Quiz on page 62 by scanning the QR code.
5. Ask two students to work out the Spot the Errors on page 42 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. Let 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 4 Quadratic Functions

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 4
Quadratic
Functions**

Application of knowledge from this chapter on your daily life:

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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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Chapter 5 – Factorization of Polynomials (11 hours)

Strand 1: Numbers and Algebra

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 1.2: 1. Understand and use factorization of polynomials of degree higher than two to solve mathematical problems.	<ul style="list-style-type: none">• Factorizing using the special product method• Factorizing using the highest common factor (HCF)• Factorizing using the grouping method• Factorizing using the synthetic division method

Learning Objectives

Students will be taught to:

1. Factorize polynomials using the special product method.
2. Factorize polynomials using the highest common factor (HCF) method.
3. Factorize polynomials using the grouping method.
4. Factorize polynomials using the synthetic division method.
5. Factorize polynomials completely.

Learning Outcomes

Students will be able to:

1. State the difference of squares.
2. Find the perfect square trinomial.

3. Find the sum and difference of cubes.
4. Factorize polynomials using the special product method.
5. Factorize polynomials using the highest common factor (HCF) method.
6. Factorize polynomials using the grouping method.
7. Factorize polynomials using the synthetic division method.
8. Factorize polynomials completely.

Learning Areas

- Factorization of polynomials

Teaching and Learning Activities

1st – 3rd hours (Factorizing using the Special Product Method)

1. Let students do the Flashback to help them recall certain Mathematical concepts.
2. Use Example 1 to explain to students how to factorize the polynomials.
3. Have students work on Question 1 in Test Yourself 5.1.
4. Show students how to multiply a binomial by itself once to get the resulting trinomial called a perfect square trinomial. Use Examples 2 and 3 to explain more.
5. Test students by asking them to try Questions 2 and 3 in Test Yourself 5.1.
6. Use Example 4 to find the sum and difference of cubes and factorize the polynomials.
7. Have students try Question 4 in Test Yourself 5.1.
8. Ask students to work on the exercises in this subtopic on pages 46 and 47 of the Workbook as their homework.

4th – 6^h hours (Factorizing using the Highest Common Factor (HCF))

1. Guide students to find the factors of a monomial using Example 5.
2. Have students to do Question 1 in Test Yourself 5.2 to test students' understanding.
3. Explain how to find common factors and the highest common factor of a few terms using Examples 6 and 7.
4. Let students to do Questions 2 and 3 in Test Yourself 5.2.
5. Factorize the polynomials using Example 8. Have students to try Question 4 in Test Yourself 5.2.
6. Ask students to work on the exercises in this subtopic on page 48 of the Workbook as their homework.

7th – 8th hours (Factorizing using the Grouping Method)

1. Use Example 9 to explain how to factorize the polynomials using grouping.
2. Test students by asking them to try Question 1 in Test Yourself 5.3.
3. Have students work on Questions on page 49 of the Workbook as their homework.

9th – 10th hours (Factorizing using the Synthetic Division Method)

1. Factorize some polynomials using the synthetic division. Use Examples 10 to 12 for further explanation.
2. Test students by asking them to try Questions 1 and 2 in Test Yourself 5.4.
3. Have students work on Questions on pages 50 and 51 of the Workbook as their homework.

11th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 77.
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 78.
4. Encourage them to try the QR Quiz on page 78 by scanning the QR code.
5. Ask two students to work out the Spot the Errors on page 52 in the Workbook and discuss with them.
6. Randomly select 2 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.
7. 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 5 Factorization of Polynomials

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 5
Factorization of
Polynomials**

Application of knowledge from this chapter on your daily life:

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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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Chapter 6 – Surface Areas and Volumes of Pyramids, Cones and Spheres (11 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
<p>Standard M. 2.1:</p> <p>1. Apply the knowledge of surface area of pyramids, cones and spheres to solve mathematical problems and real-life problems.</p> <p>2. Apply the knowledge of volume of pyramids, cones and spheres to solve mathematical problems and real-life problems.</p>	<ul style="list-style-type: none">• Surface areas of pyramids, cones and spheres• Volumes of pyramids, cones and spheres

Learning Objectives

Students will be taught to:

1. Find the surface areas of pyramids, cones and spheres.
2. Apply the knowledge of surface areas to solve mathematical problems and real-life problems.
3. Find the volumes of pyramids, cones and spheres.
4. Apply the knowledge of volume to solve mathematical problems and real-life problems.

Learning Outcomes

Students will be able to:

1. Find the surface areas of pyramids, cones and spheres.

2. Apply the knowledge of surface areas to solve mathematical problems and real-life problems.
3. Find the volumes of pyramids, cones and spheres.
4. Apply the knowledge of volume to solve mathematical problems and real-life problems.

Learning Areas

- Surface areas of pyramids, cones and spheres
- Volumes of pyramids, cones and spheres

Teaching and Learning Activities

1st – 5th hours (Surface Areas of Pyramids, Cones and Spheres)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Let students to describe the properties of a pyramid. Define what surface area of a solid is. Have students to find the surface area of a pyramid using Example 1.
3. Let students to try Question 1 in Test Yourself 6.1.
4. Describe the properties of a cone and find the surface area of a cone. Use Example 2.
5. Have two volunteers work on Question 2 in Test Yourself 6.1.
6. Go through the properties of a sphere with the students. Find the surface area of a sphere. Use Example 3 for explanation.
7. Test students' understanding by asking them to try Question 3 in Test Yourself 6.1.
8. Guide students to find other information from total surface area using Examples 4 to 6.
9. Have three students try Questions 4 to 6 in Test Yourself 6.1.
10. Have students do Questions on pages 55 to 60 of the workbook as their homework.

6th – 10th hours (Volumes of Pyramids, Cones and Spheres)

1. Show students the formula to find the volume of a right pyramid. Explain to them with Example 7. Let students try Question 1 in Test Yourself 6.2.
2. Guide students to find the volume of a right circular cone using Example 8.
3. Have two volunteers try Question 2 in Test Yourself 6.2.
4. Using Example 9 to find the volume of a sphere. Have students to try Question 3 in Test Yourself 6.2.
5. Have students do Questions 1 to 4 on pages 61 and 62 of the workbook as their homework.
6. Explain a composite solid which is made up of two or more solids. Guide students to find the volumes of composite solids using Example 10.
7. Let students to solve Question 4 in Test Yourself 6.2.
8. Show students to find other information from volume using Examples 11 and 12.
9. Have some students try Questions 5 to 10 in Test Yourself 6.2.
10. Have students do Questions 5 to 9 on pages 63 and 68 of the workbook as their homework.

11th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 92.
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 93.
4. Encourage them to try the QR Quiz on page 93 by scanning the QR code.
5. Ask 2 students to work out the Spot the Errors on page 69 in the Workbook and discuss with them.

6. Randomly select 5 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.
7. 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. Analyzing skill

Learning Materials:

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 6 Surface Areas and Volumes of Pyramids, Cones and Spheres

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 6
Surface Areas and
Volumes of Pyramids,
Cones and Spheres**

Application of knowledge from this chapter on your daily life:

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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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Chapter 7 – Similarity (10 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Understand and apply the properties of similar triangles to solve mathematical problems and real-life problems.	<ul style="list-style-type: none">• Scale drawings• Similar Triangles

Learning Objectives

Students will be taught to:

1. Understand the concept of scale drawing.
2. Understand similar triangles.
3. Solve problems involving similar triangles.

Learning Outcomes

Students will be able to:

1. Sketch shapes using grid paper.
2. Draw shapes according to given scales.
3. Draw composite shapes.
4. Draw composite shapes using grids of different sizes.
5. Solve problems involving scale drawings.
6. Know the properties of similar triangles.
7. Determine if a pair of triangles is similar triangles.

Learning Areas

- Scale drawing
- Similar triangles

Teaching and Learning Activities

1st – 5th hours (Scale Drawing)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Explain what a scale drawing is.
3. Using Example 1, guide students to understand further.
4. Get students to answer Question 1 in Test Yourself 7.1. Discuss the answers with them.
5. Explain the scale used in scale drawing. If the scale of a drawing is $1:n$, so the diagram is drawn with the size “1” and the object would have a size of n . Use Examples 2 to 4 for further explanation.
6. Ask students to try Question 2 in Test Yourself 7.1. Discuss the answers with them.
7. Guide students to draw composite shapes using scales on grid paper and on blank paper. Use Examples 5 to 8.
8. Test their understanding by asking them to try Questions 3 to 5 in Test Yourself 7.1.
9. Guide students to solve problems involving scale drawings using Example 9.
10. Have students to try Questions 6 to 9 in Test Yourself 7.1.
11. Have students work on Questions on pages 73 to 77 of the Workbook as their homework.

6th – 9th hours (Similar Triangles)

1. Explain what similar triangles are and how to determine them by using Example 10.
2. Test students' understanding by asking them to try Question 1 in Test Yourself 7.2.
3. Guide students to find lengths of similar triangles using Examples 11 and 12.
4. Ask students to try Questions 2 to 4 in Test Yourself 7.2. Discuss the answers with them.
5. Have students work on the exercises in this subtopic on pages 78 to 80 of the Workbook as their homework.

10th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 110.
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 111.
4. Encourage them to try the QR Quiz on page 111 by scanning the QR code.
5. Ask a student to work out the Spot the Errors on page 81 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

- Critical thinking skill
- Problem-solving skill
- Analyzing skill
- Drawing skills

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 7 Similarity

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 7 Similarity

Application of knowledge from this chapter on your daily life:

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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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Chapter 8 – Trigonometric Ratios (14 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Understand and apply the knowledge of trigonometric ratios to solve mathematical problems and real-life problems.	<ul style="list-style-type: none">• Tangent• Sine• Cosine• Values of tangent, sine and cosine

Learning Objectives

Students will be taught to:

1. Understand and use tangent of an angle in a right-angled triangle.
2. Understand and use sine of an angle in a right-angled triangle.
3. Understand and use cosine of an angle in a right-angled triangle.
4. Apply trigonometric ratios to solve problems.

Learning Outcomes

Students will be able to:

1. Understand the concept of tangent.
2. Understand the concept of sine.
3. Understand the concept of cosine.
4. Find the value of the tangent, sine or cosine of an angle.
5. Find lengths of sides from the tangent, sine or cosine of an angle.

6. Calculate values of trigonometric ratios.
7. Find values of trigonometric ratios of 30° , 45° and 60° .
8. Find angles with trigonometric values using a scientific calculator.
9. Apply trigonometric ratios to solve problems.

Learning Areas

- Tangent
- Sine
- Cosine
- Values of Tangent, Sine and Cosine

Teaching and Learning Activities

1st – 3rd hours (Tangent)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Guide students to identify the sides in respect to an acute angle using Example 1. Let students try Question 1 in Test Yourself 8.1.
3. Guide students about the concept of tangent. The tangent of an angle is constant when the size of triangle changes proportionally. Use Example 2 for explanation.
4. Let students to do Question 2 in Test Yourself 8.1.
5. Using Example 3, show students how to find the value of the tangent of an angle. Have students work on Question 3 in Test Yourself 8.1.
6. Guide students on how to find lengths of sides from the tangent of an angle using Example 4.
7. Have three students work on Question 4 in Test Yourself 8.1. Discuss the answers with them.
8. Ask students to work on the exercises in this subtopic on pages 86 and 87 of the Workbook as their homework.

4th – 6th hours (Sine)

1. Explain the concept of sine. Using Example 5 for further explanation.
2. Test students' understanding by asking them to do Question 1 in Test Yourself 8.2.
3. Using Example 6, guide students on how to find the value of the sine of an angle.
4. Have three volunteers to do Question 2 in Test Yourself 8.2. Discuss the answers with them.
5. Using Example 7, guide students on how to find lengths of sides from the sine of an angle.
6. Spend time with students to solve Question 3 in Test Yourself 8.2.
7. Let students to work on the exercises in this subtopic on pages 88 and 89 of the Workbook as their homework.

7th – 10th hours (Cosine)

1. Explain the concept of cosine. Using Example 8, guide students on how to determine the $\cos \theta$.
2. Test students' understanding by asking them to do Question 1 in Test Yourself 8.3.
3. Guide students to find the value of the cos of an angle using Example 9.
4. Have students work on Question 2 in Test Yourself 8.3. Discuss the answers with them.
5. Using Example 10, show students how to find lengths of sides from the cosine of an angle.
6. Have three students work on Question 3 in Test Yourself 8.3.
7. Let students to work on the exercises in this subtopic on pages 90 and 91 of the Workbook as their homework.

11th – 13th hours (Values of Tangent, Sine and Cosine)

1. Using Examples 11 and 12, guide students on how to calculate values of trigonometric ratios.
2. Have students work on Questions 1 to 3 in Test Yourself 8.4. Discuss the answers with students.
3. Guide students to find values of trigonometric ratios of 30° , 45° and 60° .
4. Have two students answer Questions 4 and 5 in Test Yourself 8.4.
5. Show students to find angles with trigonometric values. Let students to try Question 6 in Test Yourself 8.4.
6. Guide students to solve problem involving tangent, sine and cosine.
7. Have students answer Questions 7 to 9 in Test Yourself 8.4.
8. Ask students to work on the exercises in this subtopic on pages 92 to 98 of the Workbook as their homework.

14th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 132.
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 133.
4. Encourage them to try the QR Quiz on page 133 by scanning the QR code.
5. Ask 3 students to work out the Spot the Errors on page 98 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 8 Trigonometric Ratios

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 8
Trigonometric
Ratios**

Application of knowledge from this chapter on your daily life:

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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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Chapter 9 – Circles (13 hours)

Strand 2: Measurement and Geometry

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 2.2: 1. Understand and apply circle theorems to solve mathematical problems.	<ul style="list-style-type: none">• Parts of a circle• Angles in a circle• Cyclic quadrilaterals• Angles between tangents and cords

Learning Objectives

Students will be taught to:

1. Recognize the parts of a circle.
2. Understand and use the properties of angles in circles to solve problems.
3. Understand and use the concept of cyclic quadrilaterals to solve problems.
4. Understand and use the concept of tangents to a circle to solve problems.
5. Understand and use the properties of angles between tangents and chords to solve problems.

Learning Outcomes

Students will be able to:

1. Identify the parts of a circle.
2. Find angles subtended by an arc.

3. Find angles subtended at the circumference by the same arch.
4. Find angles subtended by the arcs of the same length.
5. Find angles subtended at the center and at the circumference by the same arc.
6. Find angle subtended at the circumference in a semicircle.
7. Solve problems involving angles subtended at the center and circumference.
8. Find interior opposite angles of a cyclic quadrilateral.
9. Find exterior angle and the corresponding interior opposite angle of a cyclic quadrilateral.
10. Solve problems involving angles of a cyclic quadrilateral.
11. Find angles between tangents and cords.
12. Solve problems involving angles in alternate segments.

Learning Areas

1. Parts of a circle
2. Angles in a circle
3. Cyclic quadrilaterals
4. Angles between tangents and cords

Teaching and Learning Activities

1st – 2nd hours (Parts of a Circle)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Students describe the parts of a circle. Use Example 1 to name the parts of a circle. Have students work on Question 1 in Test Yourself 9.1.
3. Guide students on how to draw a circle and label its parts using Example 2. Let students try Question 2 in Test Yourself 9.1.
4. Ask students to work on the exercises in this subtopic on page 103 of the Workbook as their homework.

3rd – 6th hours (Angles in a Circle)

1. Guide students to find angles subtended by an arc using Example 3.
2. Get two volunteers to work out Question 1 in Test Yourself 9.2.
3. Students will also find angles subtended at the circumference by the same arch. Refer to Example 4. Let students to try Question 2 in Test Yourself 9.2.
4. Show students to find angles subtended by the arcs of the same length using Example 5. Try Question 3 in Test Yourself 9.2 too.
5. Explain to find angles subtended at the center and at the circumference by the same arc using Example 6.
6. Using Examples 7 and 8, find the angle subtended at the circumference in a semicircle.
7. Get students to work on Questions 4 to 6 in Test Yourself 9.2.
8. Solve problems involving angles subtended at the center and circumference using Example 9.
9. Ask students to work on the exercises in this subtopic on pages 104 to 106 of the Workbook as their homework.

7th – 9th hours (Cyclic Quadrilaterals)

1. Guide students to find interior opposite angles of a cyclic quadrilateral using Example 10. Let students try Question 1 in Test Yourself 9.3.
2. Show students to find exterior angle and the corresponding interior opposite angle of a cyclic quadrilateral using Example 11.
3. Test their understanding by asking them to do Question 2 in Test Yourself 9.3.
4. Using Example 12, guide students to solve problems involving angles of a cyclic quadrilateral.
5. Let students try Question 3 in Test Yourself 9.3.
6. Ask students to work on the exercises in this subtopic on pages 107 to 109 of the Workbook as their homework.

10th – 12th hours (Angles between Tangents and Cords)

1. Guide students to find angles in the alternate segment subtended by a cord through the contact point of a tangent to a circle. Refer to Example 13.
2. Using Example 14 to show the relationship between the angle formed by a tangent and a cord and the angle in the alternate segment.
3. Let students to do Questions 1 and 2 in Test Yourself 9.4.
4. Show problems involving angles in alternate segments using Examples 15 and 16.
5. Test students' understanding by asking them to carry out the task in Questions 3 to 6 in Test Yourself 9.4.
6. Ask students to work on the exercises in this subtopic on pages 110 to 112 of the Workbook as their homework.

13th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on pages 155 and 156.
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 pages 156 and 157.
4. Encourage them to try the QR Quiz on page 157 by scanning the QR code.
5. Ask 2 students to work out the Spot the Errors on page 113 in the Workbook and discuss with them.
6. Randomly select 5 questions from the Mastery Practice in the Textbook and let students solve them in the class. Have students work on the rest of the questions at home.
7. Ask students to do the Enrichment Exercises in the Workbook to test their understanding of this chapter as their homework.

Emphasized Characteristics

- Thinking skill
- Problem-solving skill
- Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 9 Circles

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 9
Circles**

Application of knowledge from this chapter on your daily life:

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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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Chapter 10 – Box Plots (6 hours)

Strand 3: Statistics and Probability

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 3.1: 1. Understand and use the knowledge of statistics in presenting and analyzing data from box plot and interpret the results and also apply statistics into real life with appropriate technology.	<ul style="list-style-type: none">• Constructing box plots• Interpreting box plots

Learning Objectives

Students will be taught to:

1. Understand the five-number summary of a box plot such as the highest value, lowest value, median, first quartile and third quartile.
2. Construct a box plot based on the five-number summary.
3. Analyze and interpret a box plot.

Learning Outcomes

Students will be able to:

1. Find the median of a set of data.
2. Find the first and third quartiles of a set of data.
3. Find the range and interquartile range of a set of data.
4. Construct box plots.
5. Interpret box plots.

Learning Areas

- Constructing box plots
- Interpreting box plots

Teaching and Learning Activities

1st – 3rd hours (Constructing Box Plots)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Define what a box plot is. Explain what median is and how to determine the median from a set of data. Use Example 1.
3. Test their understanding by asking them to try Question 1 in Test Yourself 10.1.
4. Guide students to find the first and third quartiles of a set of data using Examples 2 and 3. Let students to do Question 2 in Test Yourself 10.1.
5. Show students to find the range and interquartile range of a set of data using Example 4.
6. Test students' understanding by asking them to try Question 3 in Test Yourself 10.1.
7. Show steps to construct a box plot to represent the data. Use Examples 5 and 6.
8. Let students to do Question 4 in Test Yourself 10.1.
9. Have students work on Questions on pages 117 to 120 of the Workbook as their homework.

4th – 5th hours (Interpreting Box Plots)

1. Use Examples 7 and 8 to interpret box plots.
2. Have students try Questions 1 to 3 in Test Yourself 10.2. Discuss the answers with them.
3. Have students work on Questions on pages 121 and 122 of the Workbook as their homework.

6th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on page 168.
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 169.
4. Encourage them to try the QR Quiz on page 169 by scanning the QR code.
5. Ask two students to work out the Spot the Errors on page 123 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 10 Box Plots

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 Box Plots

Application of knowledge from this chapter on your daily life:

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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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Chapter 11 – Probability (12 hours)

Strand 3: Statistics and Probability

Learning Standards and Learning Areas

Learning Standards	Learning Areas
Standard M. 3.2: 1. Understand a random experiment and use the outcomes to find out the probability of the situations.	<ul style="list-style-type: none">• Events and Outcomes• Probability• Outcomes from Independent Events

Learning Objectives

Students will be taught to:

1. Understand events and outcomes.
2. Understand the probability of an outcome.
3. Understand the outcomes from independent events.

Learning Outcomes

Students will be able to:

1. Understand events and outcomes.
2. Understand the equally likely outcomes.
3. Understand the not equally likely outcomes.
4. Understand the probability of an outcome.
5. Understand the probability scale.
6. Calculate probabilities.
7. Understand the tree diagrams.
8. Understand independent events.

Learning Areas

- Events and outcomes
- Probability
- Outcomes from independent events

Teaching and Learning Activities

1st – 3rd hours (Events and outcomes)

1. Ask students to do the Flashback to help them recall certain Mathematical concepts.
2. Explain what events and outcomes are. Use Example 1.
3. Test their understanding by asking them to try Question 1 in Test Yourself 11.1.
4. Explain what equally likely and not equally likely outcomes mean. Use Examples 2 and 3.
5. Ask a few students to try Questions 2 to 4 in Test Yourself 11.1. Discuss the answers with them.
6. Have students work on Questions 1 to 3 on pages 127 to 129 of the Workbook as their homework.

4th – 7th hours (Probability)

1. Explain what probability is and how probability can be stated in fraction form.
2. Use Example 4 to explain further.
3. Have two students try Questions 1 in Test Yourself 11.2.
4. Remind students what a probability scale is. Remind them of the terms such as ‘impossible’, ‘not likely’, ‘even’, ‘likely’ and ‘definitely’ used to describe how likely an outcome of an event. Use Examples 5 and 6.
5. Test their understanding by asking them to try Questions 2 and 3 in Test Yourself 11.2. Discuss the answers with them.

6. Have students work on Questions 1 to 3 on pages 102 to 105 of the Workbook as their homework.
7. Guide students to calculate probabilities for events. Use Examples 7 and 8.
8. Have a few students try Questions 4 to 6 in Test Yourself 11.2. Discuss the answers with them.
9. Using Example 9, guide students to calculate probabilities of experiments.
10. Test their understandings by asking them to try Question 7 in Test Yourself 11.2. Discuss the answers with them.
11. Have students work on Questions on pages 129 to 135 of the Workbook as their homework.

8th – 11th hours (Outcomes from Independent Events)

1. Explain what tree diagrams are and how they are used in calculating probability.
2. Use Example 10 for further explanation.
3. Test their understanding by asking them to try Question 1 in Test Yourself 11.3.
4. Use Example 11 to explain the probability of outcomes of two independent events.
5. Ask students to try Question 2 and 3 in Test Yourself 11.3.
6. Have students work on Questions on pages 135 to 138 of the Workbook as their homework.

12th hour (Conclusion)

1. Explain the mistakes shown in the Common Mistakes column on pages 185 and 186.

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 pages 186 and 187.
4. Encourage them to try the QR Quiz on page 187 by scanning the QR code.
5. Ask a student to work out the Spot the Errors on page 139 in the Workbook and discuss with them.
6. Randomly select 5 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.
7. 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. Analyzing skill

Learning Materials

- Focus Smart Plus Mathematics Textbook Mathayom 3
- Focus Smart Plus Mathematics Workbook Mathayom 3



Learning Outcome Form

Name-Surname:

No.

Mathayom:

Date:

Chapter 11 Probability

Explanation: Summary of learning outcomes

