



آغا خان یونیورسٹی ایگزامینیشن بورڈ  
AGA KHAN UNIVERSITY EXAMINATION BOARD

Pacing Guide for Teachers

# GENERAL MATHEMATICS

Grade IX

Number of weeks: 28

Number of periods per week: 5

Key Textbook: General Mathematics 9 by Ali Brothran, Lahore  
and General Mathematics 10 by Ali Brothran, Lahore

Teacher Developer(s): Atifa Aleem and Rahila Shams

Institution(s): The Mama Parsi Girls Secondary School, Karachi  
and Sultan Mahomed Shah Aga Khan School, Karachi

## Topic

## Total Periods

1. Percentage, Ratio, Proportion

15

Sub-Topic	Range of SLOs	Periods (40 mins)
1.1 Percentage	1.1.1-1.1.2	2
1.2 Application of Percentages	1.2.1-1.2.2	3
1.3 Ratio	1.3.1-1.3.3	3
1.4 Proportion and Variation	1.4.1-1.4.3	7

## Learning Resources

- Oxford Mathematics book 1 (Unit 8 and 9) and Book 2 (unit 1)

## Web Resource

<https://www.mathplanet.com/education/pre-algebra/ratios-and-percent>

## Suggested Activities and/or Formative Assessment

### Activity 1:

Real-life problem solving

Give students real-life problems that involve calculating percentages, ratios, and proportions. For example, you could ask them to calculate the percentage of a discount, or the ratio of ingredients needed to make a recipe.

## **Activity 2:**

### **Peer Review**

Teachers can ask students to review each other's work or solutions to a problem. This can help students learn from each other and provide feedback on their peers' work.

## **Activity 3:**

### **Ratio card game**

Create a set of cards with different ratios on them (e.g., 3:4, 2:5, 6:7). Students can play a game of matching ratios, or they can add or subtract the ratios to see if they can simplify them.

FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

## Total Periods

2. Zakat, Ushr, Inheritance

10

Sub-Topic	Range of SLOs	Periods (40 mins)
2.1 Zakat	2.1.1-2.1.2	2
2.2 Ushr	2.2.1-2.2.2	3
2.3 Inheritance	2.3.1-2.3.2	5

## Learning Resources

- General Mathematics IX & X by Sindh Textbook Board Jamshoro (Unit 3)

## Web Resource

<https://sabaq.pk/book-page.php?b=p&c=9&s=gm>

## Suggested Activities and/or Formative Assessment

### Activity 1:

#### Inheritance Board Game

Create a board game that simulates the distribution of inheritance according to Islamic law. Players could be given different scenarios, such as the number of heirs, the value of assets, and the presence of debts, and must distribute the inheritance accordingly.

### Activity 2:

#### One-Minute Papers

Teachers can ask students to write a short response to a question or prompt at the end of class. This can help the teacher quickly assess students' understanding of the material and identify any areas that need further clarification.

### **Activity 3:**

#### **Zakat /Ushr Quiz**

Create a quiz game that tests knowledge of Ushr, including its definition, calculation, and distribution. This could be a fun way to reinforce the concepts and encourage learning.

FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

## Total Periods

6. Algebraic Formulae and Applications

20

Sub-Topic	Range of SLOs	Periods (40 mins)
6.1 Algebraic Expressions	6.1.1-6.1.6	7
6.2 Algebraic Formulae	6.2.1-6.2.2	7
6.3 Surds and their Application	6.3.1	1
	6.3.2-6.3.3	5

## Learning Resources

- Mathematics Grade 9 Science Group (Caravan Book House) (Unit 4)
- New Syllabus Mathematics Book 2 (Unit 6)
- Mathematics for 9 and 10 by Sindh Textbook Board Jamshoro (Unit 5)

## Web Resource

<http://www.purplemath.com/modules/index.htm>

## Suggested Activities and/or Formative Assessment

### Activity 1:

#### Formula Relay Race:

Divide students into teams and provide them with a list of algebraic formulae. The first person in each team must run to the board, write the formula down correctly, and then run back to tag the next team member. The next team member then runs to the board, writes the next formula, and runs back to tag the next person, and so on. The first team to correctly write down all the formulae wins.

## **Activity 2:**

### **Algebraic Kahoot**

Create a Kahoot quiz with algebraic equations and concepts. Students can play individually or in teams and the quiz can be used as a formative assessment.

## **Activity 3:**

### **Factorisation Memory Game**

Create a set of cards with expressions on one side and their factorisations on the other. Players must match the expression with its factorisation.

## **Activity 4:**

### **Constructed Responses**

Providing open-ended questions that require students to explain their thought process and provide a thorough explanation of their reasoning.

FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

7. Factorisation

## Total Periods

18

Sub-Topic	Range of SLOs	Periods (40 mins)
7.1 Factorisation	7.1.1	10
7.2 Remainder and Factor Theorems	7.2.1-7.2.3	5
7.3 Factorisation of a Cubic Polynomial	7.3.1	3

## Learning Resources

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- New Syllabus Mathematics Book 2 (Unit 6)
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## Web Resource

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## Suggested Activities and/or Formative Assessment

### Activity 1:

#### Formula Relay Race

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## **Activity 4:**

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FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

10. Practical Geometry

## Total Periods

10

Sub-Topic	Range of SLOs	Periods (40 mins)
10.1 Construction of Triangle	10.1.1	2
	10.1.2-10.1.3	5
10.2 Construction of Quadrilateral	10.2.1-10.2.3	3

## Web Resource

<https://www.youtube.com/watch?reload=9&v=Pz64J1hJV8E>

## Suggested Activities and/or Formative Assessment

### Activity 1:

#### Interactive Software

Use interactive software, such as GeoGebra or Demos, to help students visualise and construct triangles and quadrilaterals on a computer or tablet.

### Activity 2:

#### Error Spotting

Show students different constructions on the board or through visual aids and ask them to identify the errors in the construction. This will help them to identify common mistakes and improve their own construction skills.

### Activity 3:

#### Oral Presentations

Ask students to give presentations that explain their mathematical thinking and demonstrate their understanding of key concepts.

## **Activity 4:**

### **Speed Challenge**

Give students a set of measurements and see who can construct the triangle or quadrilateral the fastest. This will help them to improve their construction skills under pressure and increase their speed.

FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

## Total Periods

9. Matrices and Determinants

26

Sub-Topic	Range of SLOs	Periods (40 mins)
9.1 Introduction to Matrices	9.1.1-9.1.2	2
9.2 Types of Matrices (up to order 3x3)	9.2.1-9.2.2	3
9.3 Addition and Subtraction of Matrices (up to order 3x3)	9.3.1-9.3.5	5
9.4 Multiplication of Matrices (up to order 2x 2)	9.4.1-9.4.7	7
9.5 Multiplicative Inverse of Matrix (order 2 x 2)	9.5.1-9.5.9	5
9.6 Solution of Simultaneous Linear Equations in Two Variables	9.6.1-9.6.2	4

## Learning Resources

- Mathematics for Grade IX by Punjab Textbook Board (Unit 1)
- New Syllabus Mathematics Book 4 (Unit 5)

## Web Resource

<http://www.mathsisfun.com/algebra/matrix-introduction.html>

# **Suggested Activities and/or Formative Assessment**

## **Activity 1:**

### **Determinant Bingo**

Create a bingo card with different determinants and ask the students to mark the determinant when it is called out. The first student to get a full line of marked determinants wins the game. This activity helps students to practice their understanding of determinants.

## **Activity 2:**

### **Matrix Matching**

Create a set of cards with matrices and their determinants. The students have to match the matrix with its correct determinant. This activity helps students to practice their understanding of determinants. It can be used for multiple SLOs of Matrix.

## **Activity 3:**

### **Exit Tickets**

Have students write a brief summary of the day's lesson before leaving the classroom.

## Topic

7. Sets and Functions

## Total Periods

12

Sub-Topic	Range of SLOs	Periods (40 mins)
4.1 Set and Operations on Sets	4.1.1-4.1.3	2
4.2 Properties of Union and Intersection	4.2.1	1
4.3 Venn Diagram	4.3.1-4.3.2	3
4.4 Ordered Pairs and Cartesian Product	4.4.1-4.4.2	2
4.5 Binary Relation	4.5.1-4.5.2	2
4.6 Functions	4.6.1-4.6.3	2

## Learning Resources

- Mathematics for Grade X by Punjab Textbook Board
- New Syllabus Mathematics Book 2 (Unit 14)
- Mathematics for Grade IX and X by Sindh Textbook Board (Unit 1)
- GeoGebra Classroom Resources

## Web Resources

[http://www.math.fsu.edu/~pkirby/mad2104/SlideShow/s1\\_1.pdf](http://www.math.fsu.edu/~pkirby/mad2104/SlideShow/s1_1.pdf)

<http://www.mathcity.org/matric/9th>

# **Suggested Activities and/or Formative Assessment**

## **Activity 1:**

### **Venn diagram activity**

Provide students with a list of items and have them sort the items into appropriate regions on a Venn diagram. For example, a list of animals could be sorted into the categories of mammals, birds, and fish.

## **Activity 2:**

### **Set operations game!**

Create a set of cards with different set operations, such as union, intersection, and complement. Shuffle the cards and have students match the operation to the corresponding set.

## **Activity 3:**

### **Functions**

A multiple-choice quiz or short-answer questions can be used to assess students' understanding of functions, including domain, range, and inverse functions. For example, students could be asked to identify the domain and range of a given function.

## **Activity 4:**

### **Mini quizzes**

Give students a quick quiz with a few questions to test their comprehension of a specific lesson.

## Topic

## Total Periods

5. Exponent and Logarithm

12

Sub-Topic	Range of SLOs	Periods (40 mins)
5.1 Laws of Exponents/ Indices	5.1.1-5.1.2	3
5.2 Radicals and Radicands	5.2.1-5.2.3	2
5.3 Scientific Notation	5.3.1	1
5.4 Logarithm	5.4.1-5.4.3	2
5.5 Laws of Logarithm	5.5.1	4

## Learning Resources

- New Syllabus Mathematics Book 3 (Unit 4)
- Cambridge O Level Additional Mathematics (Unit 3)

## Suggested Activities and/or Formative Assessment

### Activity 1:

Puzzle by using Demos activity, Exponent Tower

Give students a set of base numbers and have them create an "exponent tower" by simplifying the expressions. For example, the first number could be  $2^3$ , and the next number in the tower would be  $2^{2^3}$  and so on.



## **Activity 2:**

### **Exponential word problems**

Give students a set of word problems that involve exponential growth or decay. For example, "A bacteria culture doubles every hour. If there are 100 bacteria at the start, how many will there be after 5 hours?"

## **Activity 3:**

### **Online quizzes**

Use online tools like Kahoot or Quizzes to create quick quizzes.

FOR ACADEMIC YEAR 2023 AND ONWARDS

## Topic

## Total Periods

3. Business Mathematics

8

Sub-Topic	Range of SLOs	Periods (40 mins)
3.1 Profit and Loss	3.1.1-3.1.2	2
3.2 Discount	3.2.1-3.2.3	3
3.3 Business Partnership	3.3.1-3.3.2	3

## Learning Resources

- New Syllabus Mathematics Book 3 (Unit 5)
- General Mathematics IX and X by Sindh Textbook Board Jamshoro

## Suggested Activities and/or Formative Assessment

### Activity 1:

Ask students to set up a canteen so that they can sell and purchase different things at a discounted rate. They must work with a profit and loss percentage.

There are several online games and interactive activities available that help students practice calculating profit and loss. Some examples include "The Profit Game" by Math Playground, "The Lemonade Stand Game" by Cool Math Games, and "Farm Stand Math" by Scholastic.

### Activity 2:

**Three-2-1** Ask the students to write down three things they learned, two things they found interesting, and one question they have.

## Topic

8. Linear Graph

## Total Periods

9

Sub-Topic	Range of SLOs	Periods (40 mins)
8.1 Cartesian Plane and Linear Graphs	8.1.1-8.1.3	2
	8.1.4-8.1.6	5
8.2 Conversion Graphs	8.2.1-8.2.2	2

## Learning Resources

- New Syllabus Mathematics Book 1 (Unit 6) and 2 (Unit 2)
- Mathematics 9 Grade IX by Punjab Textbook Board (Unit 8)
- GeoGebra Classroom Resources

## Web Resource

<https://www.mathsisfun.com/algebra/linear-equations.html>

## Suggested Activities and/or Formative Assessment

### Activity 1:

#### Creating linear equations

Challenge students to create their own linear equations based on given scenarios or real-world problems. For example, they might write an equation to represent the cost of renting a bicycle for a certain amount of time.

## Activity 2:

### Plotting linear graphs

Provide students with a set of linear equations, such as  $y = 2x + 1$  or  $y = -3x - 2$  and ask them to plot the graphs on a coordinate plane. This can be done either by hand or using graphing software.

FOR ACADEMIC YEAR 2023 AND ONWARDS

**Note:** This teacher-led pacing guide has been developed for AKU-EB affiliated schools to facilitate them by

- ensuring smooth transition of a school's academic year.
- ensuring curricular continuity in schools.
- predicting the time and pace of syllabi implementation.

This document also contains **suggested activities and/or formative assessments** that may enhance the learning experience. Please note that these activities are meant to serve as suggestions. As educators, you have the flexibility and autonomy to adapt and modify them to best suit the needs of your students and the dynamics of your classroom.

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