Pacing Guide for Teachers

Mathematics

Grade X

Number of weeks: 28

Number of periods per week: 5

Key Textbook: Mathematics for Grade 10 by Caravan Book House, Lahore (Mathematics 10 by Ilmi Kitab Khana, Karachi as additional reference)

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Institution(s): Habib Girls' Secondary School, Karachi and Habib Public School Karachi

Topic	Total Periods
14. Basic Statistics	22

Sub-Topic	Range of SLOs	Periods (40 mins)
14.1 Frequency Distribution and Graphs	14.1.1	1
	14.1.2	3
	14.1.3	1
	14.1.4	1
14.2 Cumulative Frequency Distribution	14.2.1	1
	14.2.2	1
14.3 Measure of Central Tendency	14.3.1	3
	14.3.2	3
	14.3.3	2
	14.3.4	1

	14.3.5	1
14.4 Measures of Dispersion (for Ungrouped data)	14.4.1	2
14.4 Measures of Dispersion (for Grouped data)	14.4.1	2

Learning Resources

- New Syllabus D, book 1, Unit 15
- New Syllabus D, book 2, Unit 16
- Syllabus D book 2, Unit 17
- Mathematics 10 Punjab Textbook Board

Web Resources

https://mr-mathematics.com/drawing-histograms-unequal-class-widths/

https://slideplayer.com/slide/4511905/

https://www.mathsisfun.com/data/frequency-grouped-mean-median-mode.html

https://www.youtube.com/watch?v=pk7Bj_xAzg4

https://www.youtube.com/watch?v=bkPm_oRPqG8

Suggested Activities and/or Formative Assessment

Activity 1

If students studied about frequency distribution table in previous classes, they will be divided into groups of 4 and different groups will collect information about a) conveyance used by their classmates, (b) favorite colors, (c) favorite games (d) favorite subjects. then each group will represent this information in frequency distribution tables (i) Direct method (ii) Tally bar methods.

Activity 2

Students will individually draw simple bar chart, multiple bar and sub-divided bar graph through GeoGebra based on given data.

Activity 3

Students in pairs can draw Histogram with equal and unequal class intervals through GeoGebra using given data.

Activity 4

Find-n-Fix

The teacher prepares several slides of incorrect problems for viewing. One by one the teacher places the problem on the overhead and allows each group to work for 2-3 minutes on the problem; time depending on the level of difficulty. The teacher begins the activity by telling the students that the following problems contain mistakes (there is no limit to how many mistakes there can be). It is up to the students to find and correct the mistakes in order to receive the points. The groups will go in their numbered order (delegated at the start of the game).

Activity 5

Prepare a quiz and assign an online quiz in pairs related to the Measure of Central Tendency and Measure of dispersion.

https://quizizz.com/admin/quiz/5ca4a91448b922001a0ac948/mean-median-mode-range-standard-deviation
https://quizizz.com/admin/quiz/5e9deda3a885ac001c93b422/mean-median-mode-box-and-whisker?isSuperRecommeded=true

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
15. Algebraic Manipulation	14

Sub-Topic	Range of SLOs	Periods (40 mins)
15.1 Highest Common Factor and Least Common Multiple	15.1.1	2
	15.1.2	3
	15.1.3	1
15.2 Basic Operations on Algebraic Fractions	15.2.1	4
15.3 Square Root of Algebraic Expressions	15.3.1	2
	15.3.2	2

Learning Resources

- Mathematics 9 Sindh Textbook Board (Unit 5)
- Oxford New Syllabus Mathematics Book 2, 7th edition (Unit 4)

Web Resources

https://www.youtube.com/watch?v=-A5H_XOUGxQ

https://www.youtube.com/watch?v=d3xr5a4cln0

https://www.youtube.com/watch?v=R2wqi0eCMpg

https://www.math-only-math.com/worksheet-on-hcf-and-lcm-of-polynomials.html

Suggested Activities and/or Formative Assessment

Activity 1

Makeup HCF/LCM Puzzles

1. Prepare a set of puzzle cards or sheets for each student or group. On each card or sheet, write down a set of numbers (2 to 4 numbers) that have common factors or multiples.
2. Mix up the puzzle cards and distribute them randomly to the students or groups.
3. Instruct the students to work together to solve the makeup HCF/LCM puzzles by finding both the HCF and LCM of the numbers on their cards.
4. Encourage the students to use different methods to find the HCF and LCM, such as prime factorization, listing multiples, etc.
5. Set a time limit for the activity to add an element of challenge and excitement.
6. Once the time is up, gather the students and ask each group to present their puzzle and explain their approach to finding the HCF and LCM.
7. Engage the class in discussions about different strategies used by each group and clarify any misconceptions.
8. Award points or small prizes to the groups that correctly solve the makeup HCF/LCM puzzles in the shortest time or with the most accurate answers.

Activity 2

Students will watch the video priory and then share their learning in pairs.

https://corbettmaths.com/wp-content/uploads/2013/02/adding-algebraic-fractions-pdf.pdf

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
16. Partial Fractions	5

Sub-Topic	Range of SLOs	Periods (40 mins)
16.1 Proper and Improper Rational Fractions	16.1.1	1
16.2 Resolution of Fraction into Partial Fraction	16.2.1 (a)	2
	16.2.1 (b)	2

Learning Resources

- Mathematics X Sindh Textbook Board (Unit 21)
- Mathematics XI Punjab Textbook Board (Unit 5)

Suggested Activities and/or Formative Assessment

Activity 1

Use the concept of Flip Classroom. Provide related content and ask students to make the concept map to relate the simplification of algebraic fractions and partial fractions.

Activity 2

Practice questions and self-check/ peer-check using the following link:

https://tutorial.math.lamar.edu/problems/alg/partialfractions.aspx

Activity 3

Card Sorting: Prepare a set of cards or slips with various rational fractions written on them. Include a mix of proper and improper fractions. For example: 1/2, 3/4, 5/3, 2/5, 7/2, 4/3, etc. Divide the class into small groups or pairs and distribute the fraction cards. Each group should sort the fraction cards into two categories: "Proper Fractions" and "Improper Fractions." After the students have sorted the fractions,

gather the groups and ask them to present their sorted cards and explain their reasoning behind each classification.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login
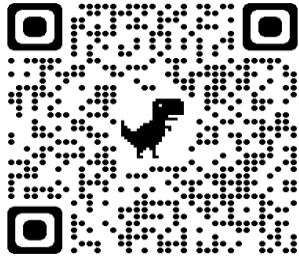
Topic   **Total Periods**

17. Linear Equations and Inequalities   17

Sub-Topic	Range of SLOs	Periods (40 mins)
17.1 Linear Equation	17.1.1	1
	17.1.2	2
	17.1.3	2
	17.1.4	2
17.2 Equation Involving Absolute Value	7.2.1-17.2.2	2
17.3 Linear Inequalities	17.3.1	1
	17.3.2	1
17.4 Solving Linear Inequalities	17.4.1	1
	17.4.2	2

	17.4.3	2
	17.4.4	1

Learning Resources

- 9 Mathematics Sindh Textbook Board (Unit 6)
- Oxford New Syllabus Mathematics Book 2, 7th edition
- New Elementary Mathematics Syllabus D (unit 7)

Suggested Activities and/or Formative Assessment

Activity 1

Students will watch the given video and then share their learning in pairs.

https://www.youtube.com/watch?v=NGag3kmub9o

Activity 2

Self and peer-assessment based on the following worksheets. Provide facilitation where needed.

https://www.cuemath.com/worksheets/linear-inequalities-worksheets/

Activity 3

Linear Inequalities Hangman

1. Create a list of linear inequalities and their corresponding solution sets. For example: 2x + 3 < 7, 3x - 5 ≥ 10, 4 - 2x > 6, x + 8 ≤ 12
2. Prepare a large whiteboard or poster to draw the Hangman scaffold. Leave space for the blanks representing the letters in the linear inequality.
3. Divide the class into two teams or more, depending on the class size.
4. Select one team to be the "Word Makers" and the other team(s) to be the "Word Guessers."
5. The Word Makers choose a linear inequality from the list and write it on the whiteboard, replacing each letter with an underscore (e.g., "_ _ _ _ + _ < _"). The Word Guessers take turns guessing letters one by one. If a guessed letter is part of the linear inequality, the Word Makers reveal its position(s) on the board. If not, the Word Makers start drawing parts of the Hangman scaffold (head, body, arms, legs, etc.).The game continues until the Word Guessers correctly guess the linear inequality (by filling in all the letters) or until the

Hangman is fully drawn. If the Word Guessers guess the linear inequality correctly, they win the round. If the Hangman is completed before the correct guess, the Word Makers win the round.

6. After each round, switch roles between the teams so that everyone gets a chance to be the Word Makers and Word Guessers.

7. As a variation, when the Word Guessers correctly guess a linear inequality, they must graph the inequality on a number line to earn extra points.

8. At the end of the activity, review the linear inequalities and their solution sets together as a class to ensure everyone understands the concepts.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic   **Total Periods**

18. Linear Graphs and Their Applications   15

Sub-Topic	Range of SLOs	Periods (40 mins)
18.1 Cartesian Plane and Linear Graph	18.1.1-18.1.3	1
	18.1.4	1
	18.1.5	1
	18.1.6	2
	18.1.7	1
	18.1.8	1
	18.1.9	1
18.2 Conversion Graphs	18.2.1	1
	18.2.2	1
18.3 Solution of Equations in two variable	18.3.1 (a)	1

	18.3.1 (b)	2
	18.3.2	2

Learning Resources

- New Elementary Mathematics Syllabus D (Units 5 & 6)
- New Additional Mathematics, Ho Soo Thong, Khor Nyak Hiong (Unit 2)

Web Resource

https://www.youtube.com/watch?v=YrTfh2VChJo

Suggested Activities and/or Formative Assessment

Activity 1

Use online simulations to plot different graphs (using equations provided in the book or by the teacher). In pairs, discuss different features of the graphs.

https://www.desmos.com/calculator/rih3fgne7h
https://www.transum.org/Maths/Activity/Graph/Desmos.asp

Activity 2

Plot the graphs given in the worksheet. Conduct peer-assessment and facilitate where needed.

https://www.oakparkusd.org/cms/lib5/CA01000794/Centricity/Domain/393/WS3%20-%20Graphing%20Linear%20Equations.pdf

Activity 3

Use graphs for quick conversion. Use the given worksheet for this activity.

https://www.mrbartonmaths.com/resources/GCSE%20Revision/GCSE%20Maths%20Takeaway/1.%20Grades%20G,%20F%20and%20E/22_conversion-graphs.pdf

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

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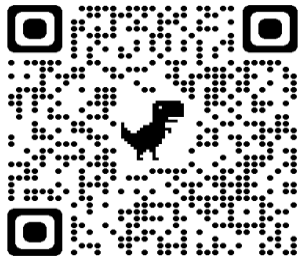
Topic
19. Quadratic Equations

Total Periods
12

Sub-Topic	Range of SLOs	Periods (40 mins)
19.1 Quadratic Equation (in one variable)	19.1.1-19.1.2	1
19.2 Solution of Quadratic Equations	19.2.1(a)	2
	19.2.1(b)	2
19.3 Quadratic Formula	19.3.1	1
	19.3.2	1
	19.3.3	2
	19.3.4	1
	19.3.5	2

Learning Resources

- Oxford New Syllabus Mathematics Book 2
- New Additional Mathematics, Ho Soo Thong, Khor Nyak Hiong (Unit 4)
- New Elementary Mathematics Syllabus D (Chapter 3)

Web Resource

Suggested Activities and/or Formative Assessment

Activity 1

Each group will prepare the presentation on one SLO and present it to the rest of the class.

Activity 2

Using some fun activities like Bingo or puzzle students will assess themselves their learning in an interesting way.

Activity 3

Further fun activities from this website:

https://www.scaffoldedmath.com/2015/03/solving-quadratics-activity-lets-make.html

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic   Total Periods

20. Introduction to Coordinate Geometry   10

Sub-Topic	Range of SLOs	Periods (40 mins)
20.1 Distance Formula	20.1.1-20.1.2	1
	20.1.3	1
20.2 Collinear Points	20.2.1	1
	20.2.2	1
	20.2.3	2
	20.2.4	2
20.3 Mid-Point Formula	20.3.1	1
	20.3.2	1

Learning Resources

- Unit 4 of New Syllabus D, book 3, 7th edition
- Coordinate Geometry Made Easy
- New syllabus D book 3, 7th edition

Suggested Activities and/or Formative Assessment

Activity 1

Students can solve the given quiz individually and then discuss their answers in pairs or groups.

https://study.com/academy/practice/quiz-worksheet-using-the-midpoint-formula.html

Activity 2

Collinear Points Art Project:

1. Provide each student with a piece of graph paper.
2. Instruct the students to choose three points on the graph paper to form a triangle.
3. Have the students calculate the distances between each pair of points using the distance formula.
4. Ask the students to label their points as A, B, and C, and write the distances AB, BC, and AC.
5. Guide the students to determine whether the points A, B, and C are collinear or non-collinear based on their distance calculations.
6. For non-collinear points, encourage the students to arrange the triangle on the graph paper to create an equilateral triangle, isosceles triangle, right-angled triangle, or scalene triangle, depending on the distances they calculated. For collinear points, have the students arrange the points to form a line and discuss the concept of collinearity.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic

Total Periods

21. Introduction to Trigonometry   18

Sub-Topic	Range of SLOs	Periods (40 mins)
21.1 Measurement of an angle	21.1.1	1
	21.1.2	1
21.2 Length of Circular Arc	21.2.1-21.2.2	1
	21.2.3	1
	21.2.4	1
	21.2.5	1
	21.2.6	1
21.3 Trigonometric Ratios	21.3.1	1
	21.3.2	2
	21.3.3	1

21.4 Trigonometric Identities	21.4.1	1
	21.4.2	2
21.5 Angle Elevation and Depression	21.5.1	1
	21.5.2	3

Learning Resources

- New Additional Mathematics, Ho Soo Thong, Khor Nyak Hiong (Unit 11 & 12)
- New Elementary Mathematics Syllabus D (Chapter 10)

Web Resource

https://www.youtube.com/watch?v=lzYxUnbDYSw

# Suggested Activities and/or Formative Assessment

Activity 1

Place the heading of different identities, Values of trigonometric ratios and angles, etc. on the soft board or on different tables. Give their relations on cards and let the students (in groups/pairs) arrange them under the heading of different functions.

http://thewessens.net/ClassroomApps/Main/trigrace.html?topic=geometry&id=8

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

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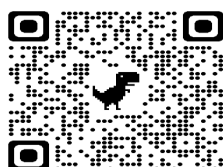
Topic	Total Periods
22. Pythagoras Theorem	3

Sub-Topic	Range of SLOs	Periods (40 mins)
22.1 Pythagoras Theorem	22.1.1	3

Learning Resources

- Oxford New Syllabus Mathematics Book 2, 7th edition (Unit 10)
- New Elementary Mathematics Syllabus D (Chapter 10)

Suggested Activities and/or Formative Assessment

Activity 1

Solve worksheets from the given website and do peer-assessment:

https://www.twinkl.com.au/resource/maths-higher-mixed-revision-activity-mats-ks4-t-m-1628705041

Activity 2:

The Pythagorean Theorem Puzzle: Prepare a set of triangle cutouts, each representing a right-angled triangle with labeled side lengths. Mix up the triangle cutouts and distribute them randomly to the students or small groups. Instruct the students to use the Pythagorean Theorem to find the length of the missing side (hypotenuse) for each triangle.

Once the students have calculated the length of the missing side for their assigned triangle, they must find the corresponding piece of a puzzle hidden around the classroom or on a worksheet.

As the students find the puzzle pieces, they should arrange them to complete a larger puzzle. The puzzle should reveal an image or a phrase related to the Pythagorean Theorem.

Once the puzzle is complete, gather the students to discuss their findings and the importance of the Pythagorean Theorem in real-life applications, such as in construction, architecture, and trigonometry.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login
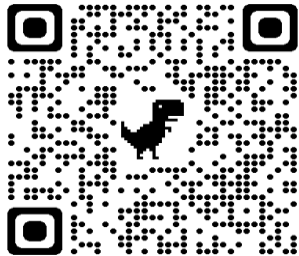
Topic

Total Periods

23. Chords of Circle

3

Sub-Topic	Range of SLOs	Periods (40 mins)
23.1 Chords of a Circle	23.1.1 (a)	1
	23.1.1 (b,c)	1
	23.1.1 (c,d)	1

Learning Resource

- Oxford New Syllabus Mathematics Book 3, 7th edition,

Web Resources

https://www.youtube.com/watch?v=XUus6-9E9sQ

https://www.youtube.com/watch?v=Uj57j84zU7A

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
24. Tangent to a Circle	2

Sub-Topic	Range of SLOs	Periods (40 mins)
24.1 Tangent to a Circle	24.1.1 (a, b)	1
	24.1.1 (c, d)	1

Learning Resource

- Oxford New Syllabus Mathematics Book 3, 7th edition

Suggested Activities and/or Formative Assessment

Activity 1

Students can also use GeoGebra to explore the properties of circles and present their findings in class.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
25. Chords and Arcs	2

Sub-Topic	Range of SLOs	Periods (40 mins)
25.1 Chords and Arcs	25.1.1 (a,b)	1
	25.1.1 (c,d)	1

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic	Total Periods
26. Angle in Segments of a Circle	5

Sub-Topic	Range of SLOs	Periods (40 mins)
26.1 Angle in a Segment of a Circle	26.1.1(a, b)	2
	26.1.1(c, d, e)	2
	26.1.1(f)	1

Web Resource

https://www.youtube.com/watch?v=Uj57j84zU7A

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login

Topic   Total Periods

27. Practical Geometry-Circles   12

Sub-Topic	Range of SLOs	Periods (40 mins)
27.1 Construction of Circle	27.1.1, 27.1.2	1
27.2 Circles Attached to Polygon	27.2.1, 27.2.4	1
	27.2.2, 27.2.5	1
	27.2.3, 27.2.6	1
	27.2.7, 27.2.9	1
	27.2.8	1
27.3 Tangent to a circle	27.3.1	2
	27.3.2 (a, b)	2
	27.3.2 (c, d)	2

Web Resources

Suggested Activities and/or Formative Assessment

Activity 1

Geometric Art Gallery:

Divide the class into small groups and provide each group with drawing materials, including rulers, compasses, protractors, and colored pencils or markers.

Explain the concept of circumscribed and inscribed shapes in triangles and circles.

Instruct each group to choose one of the following options to create their geometric artwork:

Option 1: Draw a Triangle Artwork

- Each group draws a triangle of their choice.
- Using a compass, they circumscribe a circle around the triangle and inscribe a circle within the triangle.
- They also draw escribed circles to the triangle (circles tangent to one side and the extensions of the other two sides).
- Decorate the shapes with intricate patterns or designs using colored pencils or markers.

Option 2: Draw a Circle Artwork

- Each group draws a circle of a chosen size.
- They inscribe an equilateral triangle and a square within the circle.
- They also draw circumscribed shapes (equilateral triangle, square, and regular hexagon) around the circle.
- Add artistic patterns and colors to make the artwork visually appealing.

Once the artworks are complete, create an art gallery in the classroom or a designated area.

Each group presents their artwork to the class, explaining the math concepts used in their designs, such as the formulas for circumscribed and inscribed shapes.

Encourage the class to discuss the uniqueness and creativity of each artwork, as well as the mathematical precision involved in constructing the shapes.

Display the geometric art gallery for all students to admire and appreciate the fusion of math and art.

Further Resources

For additional resources related to teaching, learning and formative assessments, please refer to **Learn Smart Classroom by Knowledge Platform:**

https://akueb.knowledgeplatform.com/login
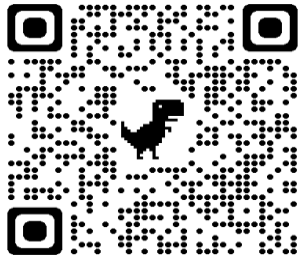
Note: This teacher-led pacing guide has been developed for AKU-EB affiliated schools to facilitate them by

- 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.

You are advised to use an ad-blocker while accessing the websites and web resources. In case any website is not functional for any reason, you may inform us at examination.board@aku.edu for an alternative or search material via any search engine.