



INDIAN SCHOOL AL WADI AL KABIR
ASSESSMENT–1(2026 - 2027)
Mathematics (Code 041)

Class: XI

Set 1

Max Marks: 80

Date: 15.09.2026

Time: 3 Hour

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQs and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 source based/case based/passage based/integrated units of assessment of 4 marks each

Section A (MCQ-1 mark each)

Q.1 $U = \{x: x \text{ is a factor of } 24\}$, $P = \{x: x \text{ is a multiple of } 3\}$, $Q = \{x: x \text{ is odd}\}$ Find $(P \cap Q)'$ 1m

A $\{3\}$ **B** $\{1, 2, 4, 6, 8, 12, 24\}$

C $\{1, 3\}$ **D** $\{2, 4, 6, 8, 12, 24\}$

Q.2 For two sets P and Q, given $n(P \times Q) = 6$ and three of the elements of $P \times Q$ are $(2,1), (5,6), (7,1)$. Then the remaining elements are: 1m

A $(2,6), (5,1), (7,6)$ **B** $(2,1), (5,6), (7,6)$

C $(1,2), (6,5), (1,7)$ **D** $(2,6), (5,6), (7,1)$

Q.3 If $\cos x = \frac{1}{3}$, then the value of $\cos 3x$ is: 1m

A $\frac{23}{27}$ **B** $-\frac{23}{27}$ **C** $\frac{7}{27}$ **D** $-\frac{7}{27}$

Q.4 If $\cot A + 1 = \operatorname{cosec} A$, then the value of $\sin 2A$ is: 1m

A 0 **B** 1 **C** -1 **D** $\frac{1}{2}$

Q.5 For the inequality: $-12 < \frac{2(x-1)}{3} \leq 0$, the solution set is: 1m

A $(-1, 20)$ **B** $(-17, 1]$ **C** $[-19, 10)$ **D** $(-17, 0]$

Q.6 If $|x - 2| \leq 5$, then x lies in: 1m

A $[-7, 3]$ **B** $(-3, 7)$ **C** $[-3, 7]$ **D** $[3, 7]$

Q.7 If $z = (2 - i)^2$, then $|z|$ equals 1m

A 25 **B** $5\sqrt{2}$ **C** 5 **D** $\frac{1}{5}$

Q.8 A convex polygon has 35 diagonals. Then the number of sides is 1m

A 10 **B** 8 **C** 9 **D** 12

Q.9 $A = \{1, 2, 3\}$, $B = \{2, 3, 4\}$, $C = \{2, 3, 5\}$, $D = \{1, 3, 5, 7\}$. Then $(A \cup B) \cap (C \cup D)$ is: 1m

A Set A **B** Set B **C** Set C **D** Set D

Q.10 If $n(A) = 5$ and $n(B) = 7$, then the minimum number of elements in $A \cup B$ is: 1m

A 2 **B** 5 **C** 7 **D** 12

Q.11 If $A = \{1, 3\}$, $B = \{1, 3, 2\}$, then the number of relations from A to B 1m

A 6 **B** 32 **C** 64 **D** 3

Q.12 Given that x, y and b are real numbers and $x < y$, $b < 0$, then 1m

A $\frac{x}{b} < \frac{y}{b}$ **B** $\frac{x}{b} \leq \frac{y}{b}$ **C** $\frac{x}{b} > \frac{y}{b}$ **D** $\frac{x}{b} \geq \frac{y}{b}$

Q.13 $1 + i^2 + i^4 + \dots + i^{20}$ equals 1m

A i **B** -1 **C** 1 **D** 0

Q.14 Conjugate of complex number $(i^3 - 4)$ is 1m

A $-4 - i$ **B** $i^3 + 4$ **C** $4 - i$ **D** $-4 + i$

Q.15 The variance of 40 observations is 3. If each observation is multiplied by 5, find the new variance of the resulting observations. 1m

A 75 **B** 80 **C** 200 **D** 15

Q.16 The number of ways 4 boys and 3 girls can be seated in a row so that they are alternate is 1m

A 124 **B** 144 **C** 204 **D** 1234

Q.17 In how many ways can 8 Indians, 4 Americans and 4 Englishmen be seated in a row so that all persons of the same nationality sit together? 1m

A $8! \times 4! \times 4!$ **B** 16! **C** $8! \times 4! \times 4! \times 3!$ **D** $4! \times 4!$

- Q.18 There are 10 points in a plane out of which 4 are collinear. Find the number of triangles formed by the points as vertices. 1m
- A** 316 **B** 104 **C** 112 **D** 116

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

- (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)
- (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- (c) Assertion (A) is true but reason (R) is false.
- (d) Assertion (A) is false but reason (R) is true.
- Q.19 **Assertion (A):** The value of $\cos 15^\circ = \frac{\sqrt{6}-\sqrt{2}}{4}$ 1m
Reason (R): $\cos(A - B) = \cos A \cos B + \sin A \sin B$
- Q.20 **Assertion (A):** If $\sqrt{a + ib} = x + iy$, then $\sqrt{a - ib} = x - iy$. 1m
Reason (R): A complex number z is said to be purely imaginary, if $\operatorname{Re}(z) = 0$.

Section B (2 marks each)

- Q.21 Solve: $7 - 2x > 5x + 14$ and represent the solution on a number line. 2m
- Q.22 a) If $\alpha + \beta = \frac{\pi}{4}$, then find the value of $(1 + \tan \alpha)(1 + \tan \beta)$ 2m
OR
 b) A bicycle wheel makes 480 revolutions in 1 minute. Through how many radians does it turn in 1 second? 2m
- Q.23 a) A student is asked to form 3-digit numbers using digits 2 to 6 without repetition. How many such numbers are less than 500? 2m
OR
 b) In how many ways can a group of 5 members be formed by selecting 3 boys out of 6 boys and 2 girls out of 5 girls? 2m

- Q.24 Let $A = \{x: x \text{ is a positive integer, } 2 \leq x \leq 8\}$ and 2m
 $B = \{x: x \text{ is a positive integer and a multiple of 3}\}$. Find (a) $A \cap B$ (b) $A - B$
- Q.25 Find the domain and range of $f(x) = \sqrt{x^2 - 36}$ 2m

Section C (3 marks each)

- Q.26 Write the domain of the function $f(x) = \sqrt{x + 5} + \sqrt{5 - x}$ and also evaluate 3m
 $f(4) + f(0)$

Q.27 a) Show that $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$. 3m

OR

b) Find the value of $\cos 570^\circ \sin 510^\circ + \sin (-330^\circ) \cos (-390^\circ)$. 3m

Q.28 Express Z in the standard form $a + ib$: $Z = \frac{(4-i)}{(1+2i)(2+i)}$ 3m

OR

Find the values of x and y, if $\frac{(1+i)x-2i}{3+i} + \frac{(2-3i)y+i}{3-i} = i$ 3m

Q.29 Find the total number of words that can be made using all letters of the word 'ALGEBRA'. If these words are arranged in dictionary order, what will be the 722nd word? 3m

Q.30 In drilling the world's deepest hole, it was found that the temperature T, in degree Celsius, x km below the surface of the earth was given by $T = 30 + 25(x - 3)$, $3 < x < 15$. At what depth will the temperature be between 200°C and 300°C . 3m

Q.31 Find the mean deviation about the mean for the following data: 20,22,24,26,26,26,26,27,27,28,28,28,30 3m

Section D (5 Marks Each)

Q.32 If $\tan x = \frac{3}{4}$, $\pi < x < \frac{3\pi}{2}$, Find the value of $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$ 5m

Q.33 a) How many liters of water can be added to 500 liters of a 60% acid solution so that the resulting mixture contains more than 25% but less than 30% acid? 5m

OR

b) Solve following system of linear inequalities:

$$\frac{3x-2}{5} + \frac{x+1}{2} \leq \frac{x-4}{10} + 3; \quad 2(x-3) > 5x-12$$

Also, represent the solution set on the number line and write the solution in set-builder form. 5m

Q.34 Calculate mean, variance and standard deviation for the following data: 5m

Class	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80	80 – 90
Frequency	4	5	15	15	8	3

Q.35 a) Find the real numbers x and y if $(x - iy)(3 + 5i)$ is the conjugate of $-6 - 24i$. 5m

OR

b) If $a + ib = \frac{(x+i)^2}{2x-i}$. Prove that $a^2 + b^2 = \frac{(x^2+1)^2}{4x^2+1}$. 5m

SECTION E (CASE STUDY QUESTIONS 4 MARKS EACH)

Q.36 In ISWK, a Google form was shared to collect students' preferences for the annual class trip. In a classroom of 50 students, it was found that 30 students like Salalah, 25 students like Wahiba Sands, and 12 students like both Salalah and Wahiba Sands.

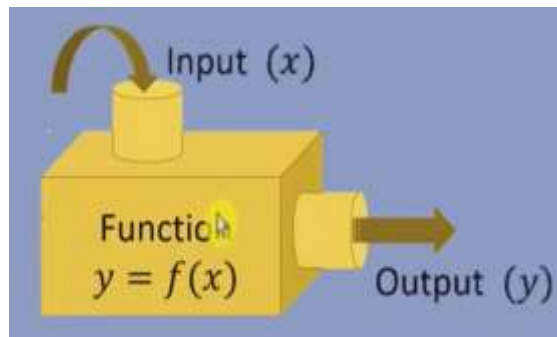
Based on this information, answer the following:

- I. Represent the given situation using a Venn diagram. 1m
- II. Number of students who like either Salalah or Wahiba Sands. 1m
- III. (a) Number of students who like neither Salalah nor Wahiba Sands. 2m

OR

(b) Write the set $\left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}\right\}$ in set builder form. 2m

Q.37 We can easily visualize a function as a machine, which produces a new element $y = f(x)$ if an element x was put in it.



Based on this information, answer the following:

- I. What will be the output of $f\left(\frac{11\pi}{4}\right)$, if the function in the machine is $f(x) = \sin x + \cos x$ 1m
- II. What will be the output of 3.5 if the greatest integer function in the machine is $f(x) = [x]$ 1m
- III. (a) If $f(x) = x^3 + 1$, find the value of $\frac{f(5)-f(1)}{5-1}$. 2m

OR

(b) Find the domain and range of the relation, $R = \{(x, y): x, y \in W, 2x + 3y = 30\}$. 2m

Q.38 For an inter-school mathematics competition, ISWK assigns a unique 8-digit identification code to each participant. Each code consists of a 2-digit House Code (HC), a 2-digit Event Code (EC) and a 4-digit Participant Code (PC). The House Code and Event Code are fixed for a particular event.

- (i) How many identification codes are possible if the code starts with 24 and no digit is repeated in the remaining positions? 1m
- (ii) How many House Codes are possible if both digits are different and each digit is greater than 5? 1m
- (iii) (a) If the House Code is 78 and the Event Code is 45, how many identification codes are possible if the digits used in the House Code and Event Code are not allowed to appear in the Participant Code? 2m

OR

(b) How many ways can the letters of the word COMPUTER be arranged so that the vowels always come together?
