

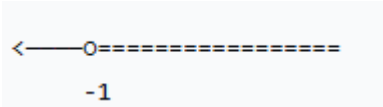


INDIAN SCHOOL AL WADI AL KABIR
ASSESSMENT I (2026 - 2027)
MARKING SCHEME

Class: XI
Date: 15.09.2026

Sub: MATHEMATICS (041)

Max Marks: 80
Time: 3 hour

Q1	B {1, 2, 4, 6, 8, 12, 24}	Q2	A (2,6), (5,1), (7,6)	Q3	B $-\frac{23}{27}$
Q4	A 0	Q5	B $(-17, 1]$	Q6	C $[-3, 7]$
Q7	D 5	Q8	A 10	Q9	A Set A
Q10	C 7	Q11	C 64	Q12	C $\frac{x}{b} > \frac{y}{b}$
Q13	C 1	Q14	D $-4 + i$	Q15	A 75
Q16	B 144	Q17	C $8! \times 4! \times 4! \times 3!$	Q18	D 116
Q19	D	Q20	A		
Q21	$x < -1$ _____ 1 M The solution can be represented on a number line as follows:  _____ 1 M				
Q22	a) $\tan(\alpha + \beta) = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$ _____ 0.5 M $\alpha + \beta = \frac{\pi}{4} \Rightarrow 1 = \frac{\tan \alpha + \tan \beta}{1 - \tan \alpha \tan \beta}$ _____ 1 M $\Rightarrow \tan \alpha + \tan \beta + \tan \alpha \tan \beta = 1$ $\therefore (1 + \tan \alpha)(1 + \tan \beta) = 1 + 1 = 2$ _____ 0.5 M OR b) 1 revolution = 2π radians _____ 0.5 M $\frac{480}{60} = 8 \text{ rev/sec}$ _____ 1 M $8 \times 2\pi = 16\pi$ _____ 0.5 M				
Q23	a)				

	For a number < 500, hundreds digit = 2, 3 or 4: 3 choices. — 1 M Tens and units: 4×3 choices. Total = $3 \times 4 \times 3 = 36$. — 1 M 36 OR b) Choose 3 boys from 6 and 2 girls from 5: ${}^6C_3 \times {}^5C_2$. — 1 M $= 20 \times 10 = 200$. — 1 M
Q24	$A = \{2, 3, 4, 5, 6, 7, 8\}$, $B = \{3, 6, 9, \dots\}$; hence $A \cap B = \{3, 6\}$. — 1 M $A - B = \{2, 4, 5, 7, 8\}$. — 1 M
Q25	For $\sqrt{x^2 - 36}$, require $x^2 - 36 \geq 0 \Rightarrow x \leq -6$ or $x \geq 6$. Domain = $(-\infty, -6] \cup [6, \infty)$. — 1 M Since $f(x) \geq 0$ and every non-negative value is attainable, Range = $[0, \infty)$. — 1 M
Q26	$\sqrt{x+5}$ and $\sqrt{5-x}$ require $x \geq -5$ and $x \leq 5 \Rightarrow$ Domain = $[-5, 5]$. — 1 M $f(4) = \sqrt{9} + \sqrt{1} = 4$. — 1 M $f(0) = \sqrt{5} + \sqrt{5} = 2\sqrt{5}$. — 1 M
Q27	a) $\tan 3x = \tan(2x + x) = \frac{\tan 2x + \tan x}{1 - \tan 2x \tan x}$ — 1 M $\tan 3x(1 - \tan 2x \tan x) = \tan 2x + \tan x$ — 1 M $\tan 3x - \tan 3x \tan 2x \tan x = \tan 2x + \tan x$ $\tan 3x \tan 2x \tan x = \tan 3x - \tan 2x - \tan x$ — 1 M OR

	$\cos 570^\circ = \cos(570^\circ - 360^\circ) = \cos 210^\circ = -\frac{\sqrt{3}}{2} - 1 \text{ M}$ $\sin 510^\circ = \sin(510^\circ - 360^\circ) = \sin 150^\circ = \frac{1}{2}$ $\sin(-330^\circ) = -\sin 330^\circ = \frac{1}{2}, \quad \cos(-390^\circ) = \cos 390^\circ = \frac{\sqrt{3}}{2} - 1 \text{ M}$ $\cos 570^\circ \sin 510^\circ + \sin(-330^\circ) \cos(-390^\circ)$ $= \left(-\frac{\sqrt{3}}{2}\right) \left(\frac{1}{2}\right) + \left(\frac{1}{2}\right) \left(\frac{\sqrt{3}}{2}\right)$ $= -\frac{\sqrt{3}}{4} + \frac{\sqrt{3}}{4} = 0 - 1 \text{ M}$
Q28	a) $(1 + 2i)(2 + i) = 5i - 1 \text{ M}$ $Z = \frac{4-i}{5i} = \frac{(4-i)(-5i)}{(5i)(-5i)} = \frac{-20i+5i^2}{25} = \frac{-5-20i}{25} = -\frac{1}{5} - \frac{4}{5}i - 2 \text{ M}$ OR b) $\frac{(1+i)x-2i}{3+i} + \frac{(2-3i)y+i}{3-i} = i$ Separate real and imaginary parts after simplifying the two fractions, then equate to 0 and 1 respectively. — 1 M Solving the resulting simultaneous equations gives $x = 3, y = -1$. — 2 M
Q29	Total arrangements = $\frac{7!}{2!} = 2520$ — 1 M For dictionary order, A occurs twice; the 722nd word falls in the B-block. The required second B-word is BAAEGRL. — 2 M
Q30	$200 < 30 + 25(x - 3) < 300 - 1 \text{ M}$ $170 < 25(x - 3) < 270 \Rightarrow 6.8 < x - 3 < 10.8 - 1 \text{ M}$ $9.8 < x < 13.8 - 1 \text{ M}$

Q31

$$\text{Mean} = \frac{338}{13} = 26 - 1 \text{ M}$$

Absolute deviations from 26 have sum 24. — 1 M

$$\text{Mean deviation} = \frac{24}{13} = 1.85 - 1 \text{ M}$$

Q32

$$\cos x = -\frac{1}{\sqrt{1+\tan^2 x}} = -\frac{1}{\sqrt{1+\frac{9}{16}}} = -\frac{4}{5} - 1 \text{ M}$$

$$\sin \frac{x}{2} = \sqrt{\frac{1-\cos x}{2}} = \sqrt{\frac{1+\frac{4}{5}}{2}} = \frac{3}{\sqrt{10}} - 1.5 \text{ M}$$

$$\cos \frac{x}{2} = -\sqrt{\frac{1+\cos x}{2}} = -\sqrt{\frac{1-\frac{4}{5}}{2}} = -\frac{1}{\sqrt{10}} - 1.5 \text{ M}$$

$$\tan \frac{x}{2} = \frac{\sin(x/2)}{\cos(x/2)} = -3 - 1 \text{ M}$$

Q33

a)

Let x L be the water added. Acid present = 300 L. — 1 M

$$0.25 < \frac{300}{500+x} < 0.30 - 1 \text{ M}$$

$$500 < x < 700 - 2 \text{ M}$$

Hence 500 – 700 L is the required open interval. — 1 M

OR

b)

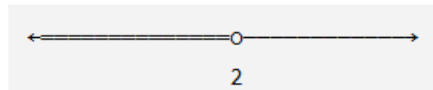
$$\frac{3x-2}{5} + \frac{x+1}{2} \leq \frac{x-4}{10} + 3$$

$$\Rightarrow 11x + 1 \leq x + 26 \Rightarrow x \leq \frac{5}{2} - 1.5 \text{ M}$$

$$2(x-3) > 5x-12$$

$$\Rightarrow -3x > -6 \Rightarrow x < 2 - 1.5 \text{ M}$$

Intersection: $x < 2$



— 1 M

Set-builder:

$$\{x \in \mathbb{R} : x < 2\} = (-\infty, 2) \text{ — 1 M}$$

Q34

Class	Mid (x)	f	$u = (x - 55)/10$	fu	fu^2
30-40	35	4	-2	-8	16
40-50	45	5	-1	-5	5
50-60	55	15	0	0	0
60-70	65	15	1	15	15
70-80	75	8	2	16	32
80-90	85	3	3	9	27
Total		$\Sigma f = 50$		$\Sigma fu = 27$	$\Sigma fu^2 = 95$

Using class marks x_i and $u = \frac{x - 55}{10}$: $\sum f_i = 50$, $\sum f_i u_i = 27$, $\sum f_i u_i^2 = 95$. — 1 M

$$\text{Mean} = 55 + 10 \left(\frac{27}{50} \right) = 60.4 \text{ — 1 M}$$

$$\text{Variance} = 100 \left[\frac{95}{50} - \left(\frac{27}{50} \right)^2 \right] = 160.84 \text{ — 2 M}$$

$$\text{Standard deviation} = \sqrt{160.84} \approx 12.68 \text{ — 1 M}$$

Q35

a)

$$(3x + 5y) + i(5x - 3y) = -6 + 24i \text{ — 2 M}$$

$$3x + 5y = -6, \quad 5x - 3y = 24 \text{ — 1.5 M}$$

$$x = 3, \quad y = -3 \text{ — 1.5 M}$$

OR

b)

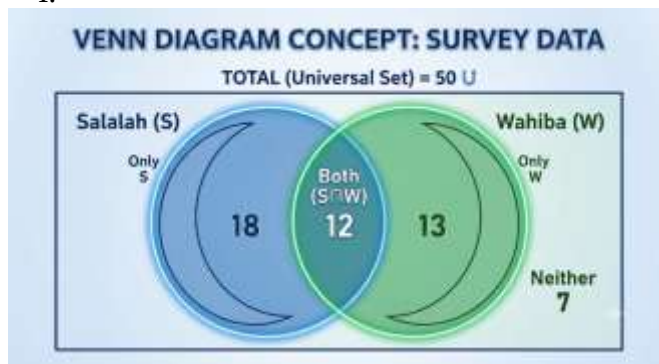
$$a^2 + b^2 = \frac{|x+i|^4}{|2x-i|^2} \text{ — 2 M}$$

$$|x+i|^2 = x^2 + 1, \quad |2x-i|^2 = 4x^2 + 1 \text{ — 2 M}$$

$$a^2 + b^2 = \frac{(x^2+1)^2}{4x^2+1} \text{ — 1 M}$$

Q36

I.



1 M

	II. 43_____1 M III. a) 7_____2 M OR b) $\left\{ \frac{n}{n+1} : n \in \mathbb{N}, 1 \leq n \leq 5 \right\}$ _____2 M
Q37	1. 0__1 M 2. 3__1 M 3. (a). 31____2 M OR (b). Domain = {0,3,6,9,12,15}, __ 1 M Range = {0,2,4,6,8,10}____1 M
Q38	(i) After fixed 24: $8 \times 7 \times 6 \times 5 \times 4 \times 3 = 20160$ — 1 M 20160 (ii) Digits > 5: 6, 7, 8, 9: $4 \times 3 = 12$ — 1 M 12 (iii-a) $6^4 = 1296$ — 2 M 1296 (iii-b OR) Vowels as one block: $6! \times 3! = 4320$ — 2 M 4320