# INDIAN SCHOOL AL WADI AL KABIR

Unit Test (2025 - 2026)

**Marking Scheme**

Class: XI    Sub: MATHEMATICS (041)    Max Marks: 30

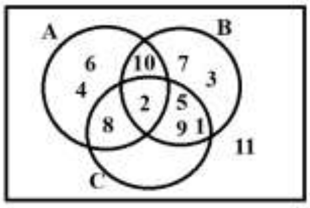
Date: 13.05.2025    Time: 1 hr

**General Instructions:**

1. This question paper is divided in to 4 sections- A, B, C and D.
2. Section A comprises of 7 questions of 1 mark each.
3. Section B comprises of 3 questions of 2 marks each.
4. Section C comprises of 3 questions of 3 marks each.
5. Section D comprises of 2 case study-based questions
6. Internal choice has been provided for certain questions

| | | | | | |
|---|---|---|---|---|---|
| 1 | D) 2 | 2 | C) 1 | 3 | C) {15, 30, 45, .........} |
| 4 | B)16 | 5 | A) Null set | 6 | B) 20 |
| 7 | (C) A is true but R is false | | | | |

**8**




\- OR -

Let $A$ and $B$ be two sets having $m$ and $n$ numbers of elements respectively.

$2^m - 2^n = 112 = 16 \times 7$

$2^n(2^{m-n} - 1) = 2^4(2^3 - 1)$

$2^n = 2^4 \rightarrow n = 4$

$m - n = 3 \Rightarrow m = 7$

**9**

it is greatest integer function.
f (x) = [x]≤ x, where x is an integer.

it is a modulus function.
f(x) = |x|

**10**

(i) $f\left(\frac{1}{x}\right) = \frac{\frac{1}{x} - 1}{\frac{1}{x} + 1} = \frac{(1-x)/x}{(1+x)/x} = \frac{1-x}{1+x} = \frac{-(x-1)}{x+1} = -f(x)$

(ii) $\frac{f(1.1) - f(1)}{(1.1 - 1)} = \frac{(1.1)^2 - (1)^2}{(1.1 - 1)} = \frac{1.21 - 1}{1.1 - 1} = \frac{0.21}{0.1}$ **= 2.1**

**11**

$A = \{2, 3, 5, 7\}$

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

(i) So, $A - B = \{5, 7\}$

$U = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 24\}$

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

So, $B' = U - B = \{5, 7, 9, 10\}$

$A = \{2, 3, 5, 7\}$

$B' = \{5, 7, 9, 10\}$

$A \cap B' = \{5, 7\}$

$A - B = \{5, 7\} = A \cap B'$

$A \cap B = \{2, 3\}$

So, $(A \cap B)' = U - \{2, 3\}$

$= \{1, 4, 5, 6, 7, 8, 9, 10, 12, 24\}$

$A' = U - A = \{1, 4, 6, 8, 9, 10, 12, 24\}$

$B' = U - B = \{5, 7, 9, 10\}$

$A' \cup B' = \{1, 4, 5, 6, 7, 8, 9, 10, 12, 24\}$

$(A \cap B)' = A' \cup B' = \{1, 4, 5, 6, 7, 8, 9, 10, 12, 24\}$

12 (i) A={F,O,L,W},B={W,O,L,F} These contain the **same elements**, just in a different order. In set theory, **order doesn't matter**, and **duplicates are ignored**.

Hence, Yes, the sets A and B are equal.

(i) n(S) = 33 & n(P) = 8

n(S) + n(P) = 33 + 8 = 41

13

Given, $f(x) = \sqrt{x^2 - 4}$ ; For $D_f$, $f(x)$ must be a real number.

$\Rightarrow x^2 - 4 \geq 0 \Rightarrow (x+2)\ (x-2) \geq 0$

$\Rightarrow$ Either $x \leq -2$ or $x \geq 2$. $\Rightarrow D_f = (-\infty, -2] \cup [2, \infty)$.

As square root of a real number is always non-negative, $y \geq 0$.

On squaring (*i*), we get $y^2 = x^2 - 4 \Rightarrow x^2 = y^2 + 4$ but $x^2 \geq 0\ \forall\ x \in D_f$.

$\Rightarrow y^2 + 4 \geq 0 \Rightarrow y^2 \geq -4$, which is true $\forall\ y \in R$,

Also, $y \geq 0$. $\Rightarrow R_f = [0, \infty)$.

$$f(x) = \frac{x^2 + 2x + 1}{x^2 - 8x + 12} = \frac{x^2 + 2x + 1}{(x-6)(x-2)}$$

It is seen that function $f(x)$

Therefore, Domain of $f(x) = R - \{2, 6\}$

**- OR -**

R = {(2,1),(3,2),(4,3),(5,4),(6,5)}

Domain of R = {2, 3, 4, 5, 6}, co-domain of R = {1, 2, 3, 4, 5, 6} and range of R = {1, 2, 3, 4, 5, 6}.

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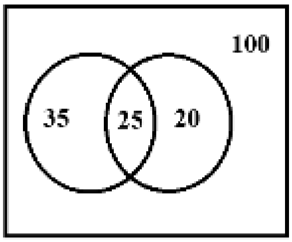
(i) 


**– OR-**

n(M ∪ C) = n(M) + n(C) − n(M ∩ C) = 60 + 45 − 25 = 80

So, students who like neither = 100 − 80 = 20

(ii) Students who like only Math = n(M only) = n(M) − n(M ∩ C) = 60 − 25 = 35

(iii) n(M ∩ C) = 25

15

$f(-2) = (-2)^2 - 2(-2) + 3 = 4 + 4 + 3 = 11$

$f(-1) = (-1)^2 - 2(-1) + 3 = 1 + 2 + 3 = 6$

$f(0) = 0^2 - 2(0) + 3 = 0 - 0 + 3 = 3$

$f(1) = 1^2 - 2(1) + 3 = 1 - 2 + 3 = 2$

$f(2) = 2^2 - 2(2) + 3 = 4 - 4 + 3 = 3$

Range of $f$ = $\{11, 6, 3, 2\}$

Let x be a pre-image of 3.

Then, f (x) = 3

$\Rightarrow x^2 - 2x + 3 = 3$

$\Rightarrow x^2 - 2x = 0$

$\Rightarrow x = 0, 2.$