O.S.DAV Public School Kaithal

May Test of Core Maths

Class – XI (2025-26) **Set - A**

Time : 1 hour 30 mins. **M.M. 40**

Instructions :

1. **All questions are compulsory.**
2. **This question paper has 5 Sections. Section A has 11 questions of 1 mark each. Section B has 3 Questions of 2 marks each. Section C has 3 questions of 3 marks each. Section D has 2 questions of 5 marks each. Section E has 1 case study question of 4 marks .**

Section - A

Q1 If U = { 1, 2, 3, ……. , 12} , A = { 8, 9, 10, 11} and B = { 1, 2, 3, 4, 5, 7, 8, 9}

then $(A - B)'$ is

a) { 1, 2, 3, 4, 5, 6, 7, 8, 9, 12} b) { 6, 8, 9, 10, 11} c) { 1, 4 , 7, 8} d) ∅

Q2 The range of the function f(x) = x^2 + 2 , x ∈ R

a) (-∞, ∞) b) [2 , ∞) c) (-∞, -2] d) (-∞, 0)

Q3 If P = {2, 7} and Q = {4, 8} then number of relations from set P to set Q are

a) 16 b) 64 c) 63 d) 45

Q4 The domain of the function f(x) = $\frac{x^2-8x+12}{x^2+2x+1}$ is

a) R – {2, 6} b) R – { 1} c) R – { -1} d) R – {0}

Q5 The value of [-9.3] - [9.6] is (where [ ] stands for greatest integer function)

a) -18 b) -19 c) -20 d) 0

Q6 Let the set A = {x: x is a letter in the word " MATHEMATICS "}, then the proper subsets of A is :

a) 2^{11} b) 2^{11} - 1 c) 2^8 d) 2^8 - 1

Q7 The value of $cot\frac{\pi}{6}$ + cosec $\frac{-\pi}{4}$ + $sec\frac{-\pi}{4}$ + $tan\frac{-\pi}{3}$ is

a) 0 b) 6 c) 4 d) 2

Q8 The radian measure of 520° is

a) $\frac{5\pi}{6}$ b) $\frac{26\pi}{9}$ c) $\frac{19\pi}{72}$ d) $\frac{35\pi}{9}$

Q9 A ∩ A' = ____

a) A b) ∅ c) A' d) U

Q10 If ($\frac{x}{3}$ + 1 , y - $\frac{2}{3}$) = ($\frac{5}{3}$, $\frac{1}{3}$) then the value of x and y are

a) x = 2 , y =1 b) x = 1 , y =1 c) x = 1 , y =2 d) x = 2 , y =2

Q11 If A and B are any two non -empty sets then choose the correct option for A and B as disjoint sets:

a) $A - B = \emptyset$ b) $A \subset B$ c) $A \cap B = \emptyset$ d) $A \cup B = \emptyset$

Section – B

Q12 If $U = \{5, 6, 7, 8, 9, 10, 11, 12\}$, $A = \{7, 8, 9, 10\}$ and $B = \{5, 8, 9, 10, 11, 12\}$.

Verify that $(A \cap B)' = A' \cup B'$

Q13 For any sets A and B, using properties show that $A \cup (B - A) = A \cup B$

Q14 Convert 6 radians into its degree measure.

Section – C

Q15 Define a relation R on the set of natural numbers N by

$R = \{(x, y) : y = x + 5, x \text{ is a natural number less than 4 and } x, y \in N\}$

i) Depict this relation in its roster form.
ii) Write the domain of R.
iii) Write the range of R.

Q16 Let A and B be sets. If $A \cap X = B \cap X = \emptyset$ and $A \cup X = B \cup X$ for some set X, show that A = B.

Q17 If in two circles arcs of same length subtend angles 60° and 75° at the centre, find the ratio of their radii.

Section - D

Q18 Find the domain and range of the function : $f(x) = \sqrt{x^2 - 81}$

Q19 a) If $\cot x = \frac{-5}{12}$, x lies in second quadrant, find the values of other five trigonometric ratios.

b) Let $A = \{1, 2\}$ and $B = \{3, 4\}$. Write A x B. How many subsets will A x B have? List them.

Section – E

Q20 After explaining operations on sets, Mathematics teacher in class wrote three sets as

$A = \{2, 3, 4, 5\}$, $B = \{6, 7, 8\}$ and $C = \{x : x \text{ is prime number less than } 10\}$. She asked the students that the following questions will judge how much you have understood.

i) $A \cup B$ ii) $C - B$ iii) $(A \cap C) - B$ iv) $(A \cup B) \cap C$

O.S. DAV Public School Kaithal

May Test of Core Maths

Class – XI (2025-26) **Set - B**

Time : 1 hour 30 mins. **M.M. 40**

Instructions :

1. **All questions are compulsory.**
2. **This question paper has 5 Sections. Section A has 11 questions of 1 mark each. Section B has 3 Questions of 2 marks each. Section C has 3 questions of 3 marks each. Section D has 2 questions of 5 marks each. Section E has 1 case study question of 4 marks .**

Section - A

Q1 The domain of the function $\frac{1}{\sqrt{3-x}}$ is :

a) (-∞,3) b) [-3,3] c) (0,3) d) (-∞,3]

Q2 If U = { 1, 2, 3, ……. , 12} , A = { 8, 9, 10, 11} and B = { 1, 2, 3, 4, 5, 7, 8, 9}

then $(B - A)'$ is

a) { 1, 2, 3, 4, 5, 7} b) { 6, 8, 9, 10, 11, 12} c) { 1, 4 , 7, 8} d) ∅

Q3 The value of $\tan(-\frac{15\pi}{4})$ is

a) 1 b) -1 c) $\frac{1}{2}$ d) $\frac{1}{5}$

Q4 The range of the function f(x) =2 – 3x, $x \in R, x > 0$

a) (-∞,2) b) [2,∞) c) (-∞,-2] d) (-∞, 0)

Q5 Let the set A = {x: x is a letter in the word " AVERAGE"}, then the proper subsets of A is :

a) 2^7 b) $2^5 - 1$ c) 2^5 d) $2^7 - 1$

Q6 The value of [7.77] - [-7.3] is (where [ ] stands for greatest integer function)

a) -18 b) -19 c) 15 d) 0

Q7 If A and B are any two non -empty sets then choose the correct option for A and B

as disjoint sets:

a) A – B = ∅ b) A ⊂ B c) A ∩ B = ∅ d) A ∪ B = ∅

Q8 A ∪ A' = ____

a) A b) ∅ c) A' d)

Q9 The radian measure of 450° is

a) $\frac{5\pi}{6}$ b) $\frac{26\pi}{9}$ c) $\frac{19\pi}{72}$ d) $\frac{5\pi}{2}$

Q10 Let A = {1, 2, 3, …….. , 14}. Define a relation R from A to A by

R = { (x, y) : 3x – y = 0, x, y ∈ R} then the domain of the relation R is

a) A b) {1, 2, 3, 4, 5, 6} c) {1, 2, 3, 4} d) {3, 6, 9}

Q11 The angle in radians through which a pendulum swings if its length is 75 cm and the tip describes an arc of length 10 cm is

a) $\frac{15}{2}$ b) $\frac{5}{2}$ c) $\frac{2}{15}$ d) $\frac{2}{5}$

Section – B

Q12 Convert 4 radians into its degree measure.

Q13 If U = { 5, 6, 7, 8, 9, 10, 11, 12}, A = { 7, 8, 9, 10} and B = {5,8, 9, 10,11, 12}.

Verify that $(A \cap B)' = A' \cup B'$

Q14 For any sets A and B, using properties show that (A – B) ∪ (A ∩ B) = A

Section – C

Q15 Draw the graph of Greatest Integer Function. Also write its domain and range.

Q16 If in two circles arcs of same length subtend angles 45° and 75° at the centre, find the ratio of their radii.

Q17 Let A ,B and C be sets such that A ∩ C = A ∩ B and A ∪ C = A ∪ B then show that C = B.

Section - D

Q18 Find the domain and range of the function : f(x) = $\frac{x^2}{1+x^2}$

Q19 a) If cos x = $\frac{-3}{5}$, x lies in third quadrant, find the values of other five trigonometric ratios.

a) Let A = {7, 8} and B = {5, 6}. Write A x B. How many subsets will A x B have? List them.

Section – E

Q20 After explaining operations on sets, Mathematics teacher in class wrote three sets as

A = {2, 3, 4, 5}, B = {6, 7, 8} and C = {x : x is prime number less than 10}. She asked the students that the following questions will judge how much you have understood.

i) A ∪ B ii) C – B iii) (A ∩ C) – B iv) (A ∪ B) ∩ C

O.S.D.A.V. Public School Kaithal
May Unit Test 2025-26
Class - XI
Set-A Subject - Core Maths

Q.No.	Value Points / Key Points	Marks.
	Section-A	
1	a)	1
2	b) $[2, \infty)$	1
3	a) 16	1
4	c) $R - \{-1\}$	1
5	b) -19	1
6	d) $2^8 - 1$	1
7	a) 0	1
8	b) $26\pi/9$	1
9	b) ϕ	1
10	a) $x=2, y=1$	1
11	c) $A \cap B = \phi$	1
	Section-B.	
12	LHS → $A \cap B = \{8, 9, 10\}$ $(A \cap B)' = \{5, 6, 7, 11, 12\}$	1
	RHS → $A' = \{5, 6, 11, 12\}$ $B' = \{6, 7\}$ $A' \cup B' = \{5, 6, 7, 11, 12\}$ $\therefore$ L.H.S. = R.H.S.	1 (2)
13	LHS $A \cup (B - A) = A \cup (B \cap A')$	$\frac{1}{2}$
	$= (A \cup B) \cap (A \cup A')$	$\frac{1}{2}$
	$= (A \cup B) \cap U$	$\frac{1}{2}$
	$= A \cup B = RHS$	$\frac{1}{2}$ (2)
14	6 radians $= \left(6 \times \frac{180}{\pi}\right)^\circ = \left(6 \times \frac{180}{22} \times 7\right)^\circ$	$\frac{1}{2}$

$= \left(\frac{3780}{11}\right)^\circ = 343^\circ \left(\frac{7}{11} \times 60\right)'$ | 1

$= 343^\circ 38' 10''$ | $\frac{1}{2}$ | 2

Section-C

Q15 $R = \{(1,6), (2,7), (3,8)\}$ | $1\frac{1}{2}$

Domain of $R = \{1, 2, 3\}$ | $\frac{1}{2}$

Ranged $R = \{6, 7, 8\}$ | $\frac{1}{2}$ | 3

Q17 $\theta = \frac{l}{r}$ $\quad \theta_1 = 60^\circ = \frac{\pi}{3}$

$\theta_2 = 75^\circ = \frac{5\pi}{12}$ | 1

$l_1 = l_2$

$\theta_1 r_1 = \theta_2 r_2$

$\frac{\pi}{3} r_1 = \frac{5\pi}{12} r_2$ | 1

$\frac{r_1}{r_2} = \frac{\frac{5\pi}{12}}{\frac{\pi}{3}} = \frac{5}{12} \times 3 = \frac{5}{4}$

So, $\frac{r_1}{r_2} = \frac{5}{4}$ $\quad 5:4$ | 1 | 3

Q16 $A \cup X = B \cup X$

Take intersection with A on both sides

$A \cap (A \cup X) = A \cap (B \cup X)$

$(A \cap A) \cup (A \cap X) = (A \cap B) \cup (A \cap X)$

$A \cup \phi = (A \cap B) \cup \phi$

$A = A \cap B$ (1) | $1\frac{1}{2}$

Also, $A \cup X = B \cup X$

Take intersection with B on both sides

$B \cap (A \cup X) = B \cap (B \cup X)$

$(B \cap A) \cup (B \cap X) = (B \cap B) \cup (B \cap X)$

$B \cap A \cup \phi = B \cup \phi$

$B \cap A = B$ (2)

from (1) & (2)

$A = B$

$\frac{1}{2}$

3

Section-D

Q18 $f(x) = \sqrt{x^2 - 81}$

For $f(x)$ to exists on real line

$x^2 - 81 \geq 0$

$(x-9)(x+9) \geq 0$

Case I	Case II
$x-9 \geq 0$ and $x+9 \geq 0$	$x-9 \leq 0$ and $x+9 \leq 0$
$x \geq 9$ and $x \geq -9$	$x \leq 9$ and $x \leq -9$
$\Rightarrow x \geq 9$	$\Rightarrow x \leq -9$
$\Rightarrow x \in [9, \infty)$	$\Rightarrow x \in (-\infty, -9]$

$\Rightarrow x \in (-\infty, -9] \cup [9, \infty)$

$\Rightarrow D_f = (-\infty, -9] \cup [9, \infty)$ 3

For Range $y = \sqrt{x^2 - 81}$

$y^2 = x^2 - 81$

$x^2 = y^2 + 81$

Now $x^2 \geq 0$ always

So, $y^2 + 81 \geq 0$

$\Rightarrow y \in (-\infty, \infty)$ — (1)

But $y = \sqrt{x^2 - 81} \geq 0$

$\Rightarrow y \in [0, \infty)$ — (2)

$\Rightarrow$ from (1) & (2) 2

$y \in [0, \infty)$ So, Range $= [0, \infty)$

5

Q19 a) $\cot x = \frac{-5}{12}$ so, $\tan x = -\frac{12}{5}$

$1 + \cot^2 x = \operatorname{cosec}^2 x$

$1 + \frac{25}{144} = \operatorname{cosec}^2 x$

$\frac{169}{144} = \operatorname{cosec}^2 x$

$\Rightarrow \operatorname{cosec} x = \pm \sqrt{\frac{169}{144}}$

$= \pm \frac{13}{12}$

In second quadrant, $\operatorname{cosec} x = \frac{13}{12}$

So, $\sin x = \frac{12}{13}$

$1 - \sin^2 x = \cos^2 x$

$1 - \frac{144}{169} = \cos^2 x$

$\Rightarrow \cos x = \pm \sqrt{\frac{25}{169}}$

$\Rightarrow \cos x = \pm \frac{5}{13}$

$\Rightarrow \cos x = -\frac{5}{13}$ (in IInd quadrant) ½ each

$\Rightarrow \sec x = -\frac{13}{5}$ 3 3

5) $A = \{1, 2\}$, $B = \{3, 4\}$

$A \times B = \{(1,3), (1,4), (2,3), (2,4)\}$

No of subsets $= 2^{2\times 2} = 2^4 = 16$

Subsets are $\rightarrow \phi$, $\{(1,3)\}$, $\{(1,4)\}$, $\{(2,3)\}$, $\{(2,4)\}$, $\{(1,3),(1,4)\}$, $\{(1,3),(2,3)\}$, $\{(1,3),(2,4)\}$, $\{(1,4),(2,3)\}$, $\{(1,4),(2,4)\}$, $\{(2,3),(2,4)\}$

$\{(1,3),(1,4)(2,3)\}$, $\{(1,3),(1,4),(2,4)\}$,
$\{(1,4),(2,3),(2,4)\}$, $\{(1,3),(1,4),(2,3),(2,4)\}$ (5

Section - E

(26) $A=\{2,3,4,5\}$, $B=\{6,7,8\}$, $C=\{2,3,5,7\}$

(i) $A \cup B = \{2,3,4,5,6,7,8\}$ 1

(ii) $C-B = \{2,3,5,7\}$ 1

(iii) $A \cap C = \{2,3,5\}$ 1

$(A \cap C) - B = \{2,3,5\}$

iv) $(A \cup B) \cap C = \{2,3,5,7\}$ 1 | 4

Set-B

1	a) $(-\infty, 3)$	1
2	b) $\{6, 8, 9, 10, 11, 12\}$	1
3	a) 1	1
4	a) $(-\infty, 2)$	1
5)	b) $2^5 - 1$	1
6	c) 15	1
7	c) $A \cap B = \phi$	1
8	d) U	1
9	d) $5\pi/2$	1
10	c) $\{1, 2, 3, 4\}$	1
11	c) 2/15	1

Section-B

12 $4 \text{ radians} = \left(4 \times \frac{180}{22} \times 7\right)^\circ$ $\frac{1}{2}$

$= \left(\frac{2520}{11}\right)^\circ$

$= 229^\circ \left(\frac{1}{11} \times 60\right)'$

$= 229^\circ\ 5' \left(\frac{5}{11} \times 60\right)''$ 1

$= 229^\circ\ 5'\ 27''$ $\frac{1}{2}$ 2

$11\overline{)2520}\,(229$ — 22 — 32 — 22 — 100 — 99 — 1

$11\overline{)300}\,(27$ — 22 — 80 — 77

13 LHS

$(A - B) \cup (A \cap B)$ 1

$= (A \cap B') \cup (A \cap B)$

$= A \cap (B' \cup B)$ 1 2

$= A \cap U$

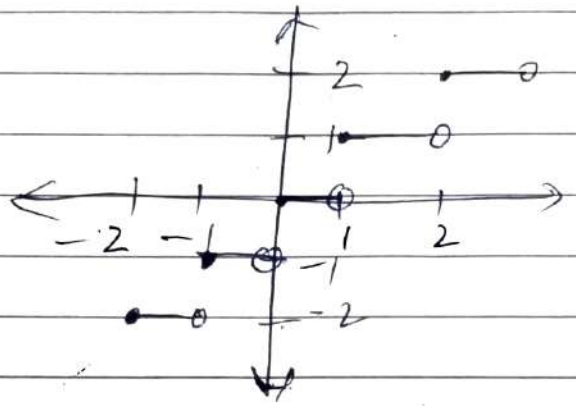
$= A = \text{RHS}$

Section-C

15 Greatest Integer fun $[x]$

$D_f = R$

$R_f = Z$



2+1 3

16 $\theta = \frac{l}{r}$ $\theta_1 = 45^\circ = \frac{\pi}{4}$

$\theta_2 = 75^\circ = \frac{5\pi}{12}$ 1

$l_1 = l_2$

$\theta_1 r_1 = \theta_2 r_2$

$\frac{\pi}{4} r_1 = \frac{5\pi}{12} r_2$ 2

$\frac{r_1}{r_2} = \frac{5}{12} \times 4 = 5:3$ 3

17 $A \cup C = A \cup B$

Take $\cap C$ on both sides

$C \cap (A \cup C) = C \cap (A \cup B)$

$(C \cap A) \cup (C \cap C) = (C \cap A) \cup (C \cap B)$

$(C \cap A) \cup C = (C \cap A) \cup (C \cap B)$

$C = (C \cap A) \cup (C \cap B)$ (1)

Also $A \cup C = A \cup B$

Take $\cap B$ on both sides

$B \cap (A \cup C) = B \cap (A \cup B)$

$(B \cap A) \cup (B \cap C) = (B \cap A) \cup (B \cap B)$

$(B \cap A) \cup (B \cap C) = (B \cap A) \cup B$

$(B \cap A) \cup (B \cap C) = (B \cap A) \cup (B \cap C) = B$ — (2)

Section - D

18 $f(x) = \frac{x^2}{1+x^2}$

D_f = Real No. 1

$y = \frac{x^2}{1+x^2}$

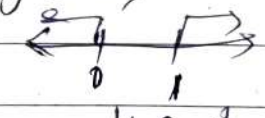
$y(1+x^2) = x^2$

$x^2(1-y) = y$

$x^2 = \frac{y}{1-y}$

As $x^2 \geq 0$ always

So, $\frac{y}{1-y} \geq 0$

Case I	Case II
$y \geq 0,\ 1-y > 0$	$y \leq 0,\ 1-y < 0$
$y \geq 0,\ 1 > y$	$y \leq 0,\ 1 < y$
	
$y \in [0,1)$	$y \in \phi$

$\Rightarrow y \in [0,1)$

So, Range = $[0,1)$ 4 5

19 a) $\cos x = \frac{-3}{5}$ x lies in III rd quadrat

$\sec x = \frac{-5}{3}$

$1 - \cos^2 x = \sin^2 x$

$\Rightarrow \sin x = \pm\sqrt{1 - \frac{9}{25}} = \pm\frac{4}{5}$ 3 2

$\Rightarrow \sin x = -\frac{4}{5}$ as x lies in III rd

$\Rightarrow \operatorname{Cosec} x = \frac{-5}{4}$ $\Rightarrow \tan x = \frac{-4}{5} / \frac{-3}{5} = \frac{4}{3}$