



PANCHSHEEL PUBLIC SCHOOL

10+2 Senior Secondary School (Affiliated & Recognized by CBSE)
Jaitpur, Badarpur, New Delhi-44

Revision paper of Mid-Term Examination (2023-24)

Time: 2 :30 hr

Subject: Maths

Class: XI

M. M. : 60

Questions 1 to 15 carry one mark each

1. If the arcs of the same length in two circles subtend angles 65° and 110° at the centre then the ratio of the radii of the circles is

- a. 22:13 b. 11:13 c. 22:15 d. 21:13

2. Let $n(A) = m$ and $n(B) = n$. Then the total number of non-empty relations that can be defined from A to B is

- a. m^n b. $n^m - 1$ c. $mn - 1$ d. $2^{mn} - 1$

3. The value of $\sin(45^\circ + \theta) - \cos(45^\circ - \theta)$ is

- a. $2 \cos \theta$ b. $2 \sin \theta$ c. 1 d. 0

4. The interval $(3, 5] =$

- a. $\{x: x \in \mathbb{R}, 3 \leq x < 5\}$ b. $\{x: x \in \mathbb{R}, 3 < x < 5\}$ c. $\{x: x \in \mathbb{R}, 3 < x \leq 5\}$ d. None of these

5. The value of $\frac{7\pi}{6}$ radian into degree measure =

- a. 210 b. 180° c. 220° d. 210°

6. The value of $\cos(-1710^\circ)$ is

- a. 1 b. 2 c. -1 d. 0

7. If $(a/4, a-2b) = (0, 6+b)$ then the value of a & b is

- a. 0, 2 b. 0, -2 c. 4, -2 d. 4, 2

8. $\cos 6x - \cos 8x$

- a. $-2 \sin 7x \sin x$ b. $2 \cos 7x \cos x$ c. $2 \sin 7x \sin x$ d. $-2 \cos 7x \cos x$

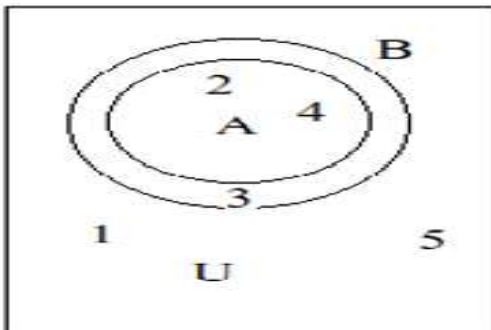
9. If A, B and C are any three sets, then $A \times (B \cup C)$ is equal to

- a. $(A \times B) \cup (A \times C)$. b. $(A \cup B) \times (A \cup C)$ c. $(A \times B) \cap (A \times C)$ d. None of the above

10. The value of $\cos 5\pi$ is

- a. 0 b. 1 c. -1 d. None of these

11. In the given Venn diagram, find $A \cup B$.



- a. $\{1, 2, 3, 4, 5\}$ b. $\{2, 3, 4\}$ c. $\{2, 4\}$ d. None of these

12. The value of $\cos 1^\circ \cos 2^\circ \cos 3^\circ \dots \cos 179^\circ$ is

- a. $\frac{1}{2}$ b. 0 c. 1 d. -1

13. Range of the function defined as $f(x) = x - 2/3 - x$

- a. $\mathbb{R} - \{2\}$ b. $\mathbb{R} - \{3\}$ c. $\mathbb{R} - \{1\}$ d. $\mathbb{R} - \{-1\}$

14. The length of an arc of a circle of radius 5cm subtending a central angle measuring 15° is

- a. $\frac{5\pi}{12}$ cm. b. 75 cm c. $\frac{\pi}{12}$ cm d. 3cm

15. **Assertion (A):** If $(4x + 3, y) = (3x + 5, -2)$ then $x = 2$ & $y = -2$

Reason (R): If $A = \{-1, 3, 4\}$ then $A \times A = \{(-1, -1), (-1, 3), (-1, 4), (3, -1), (4, -1), (3, 4)\}$

- a. A is true, R is true and R is the correct explanation of A.
b. A is true, R is true but R is not the correct explanation of A.
c. A is true R is false.
d. A is false R is true.

Questions 16 to 20 carry two marks each

16. Find the value of $\tan x$ if $\sin x = 3/5$ and x lies in second quadrant.

17. Draw appropriate Venn - diagram for

- (i) $A' \cap B'$ (ii) $(A - B)'$

18. Find the value of $\sqrt{3} \operatorname{cosec} 20^\circ - \sec 20^\circ$.

19. Find the range of the real function $f(x) = 1 - |x - 2|$

20. If $\tan A = 1/2$ and $\tan B = 1/3$, then find the value of $A + B$.

Questions 21 to 24 carry three marks each

21. Prove that:

$$2\cos \pi/13 \cdot \cos 9\pi/13 + \cos 3\pi/13 + \cos 5\pi/13 = 0$$

22. (a) What is the difference between equivalent set and equal set?

(b) If $R_1 = \{(x, y) \mid y = 2x + 7, \text{ where } x \in \mathbb{R} \text{ and } -5 \leq x \leq 5\}$ is a relation. Then find the domain and range of R_1 .

23. If $A = \{2, 3, 4, 5, 6, 7, 8, 9\}$. Let R be a relation on A defined by $R = \{(x, y) : x, y \in A \text{ and } x \text{ divides } y\}$. Find

- (a) R in the roster form. (b) Domain and range of R .

24. Prove that:

$$\frac{\cos 7x + \cos 5x}{\sin 7x - \sin 5x} = \cot x$$

Questions 25 to 27 carry five marks each

25. (i) If $f(x) = ax + b$, where a and b are integers, $f(-1) = -5$ and $f(3) = 3$, then find the value of a and b .

(ii) If $A = \{1, 2, 3\}$, $B = \{3, 4\}$ & $C = \{4, 5, 6\}$, then find $A \times (B \cap C)$.

(iii) Find the principal solutions of the equation $\tan x = -1/\sqrt{3}$.

26. Find the domain and range of the real function $f(x) = \sqrt{9 - x^2}$

27. Prove that:

$$\cos 2x \cos \frac{x}{2} - \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$$

28. **Case study 1:**

A relation f from a non-empty set A to a non-empty set B is said to be a function if every element of set A has one and only one image in set B .

In other words, we can say that a function f is a relation from non-empty set A to a non-empty set B such that the domain of f is A and no two distinct order pairs in f have the same first element for component.

If f is a function from a set A to a set B then, we write $f: A \rightarrow B$ and it is read as f is a function from A to B or f maps A to B .

(i) If $f(x) = x^2 + 2x + 3$ then among $f(1)$, $f(2)$ and $f(3)$, which one gives the maximum value.

(ii) If $f(1+x) = x^2 + 1$, then find the value of $f(2-h)$.

(iii) If $f(x) = 1/(2 - \sin 3x)$ then find the range.

29. **Case study 2:**

A quadrilateral $ABCD$ inscribed in a circle:

- (i) Find the value of $\cos(A+B+C)$
(ii) Simplify: $\sin(A+B) \cdot \sin(A-B)$