

CBSE (CLASS - XI) Maths Half - Yearly Mock Test**FULL MARKS : 70****MAX. TIME : 2 hrs****Section: A****(1 * 8 = 08)**

- Is the given relation a function? Justify your answer in one line. $R = \left\{ (2,3), \left(\frac{1}{2}, 0\right), (2,7), (-4,6) \right\}$
- The set $(A \cap B^c)^c \cup (B \cap C)$ is equal to _____.
 (a) $A^c \cup B \cup C$ (b) $A^c \cup B$ (c) $A^c \cap B$ (d) $A^c \cup C^c$
- The domain and range of the real function f defined by $f(x) = \frac{4-x}{x-4}$ is given by _____ and _____.
- A circular wire of radius 3 cm is cut and bent so as to lie along circumference of a loop whose radius is 48 cm. find the angle in degrees which is subtended at the centre of loop.
- The argument of $\sin \frac{f}{5} + i \left(1 - \cos \frac{f}{5} \right)$ is _____.
- If $\frac{|2-x|}{x-2} \geq 0$, then
 (a) $x \in [2, \infty)$ (b) $x \in (2, \infty)$ (c) $x \in (-\infty, 2)$ (d) $x \in (-\infty, 2]$
- ${}^{15}C_8 + {}^{15}C_9 - {}^{15}C_6 - {}^{15}C_7 =$ _____.
- The number of terms in the expansion of $(a+b+c)^n$, where $n \in N$ is _____.

Section: B**(4 * 8 = 32)**

- From 50 students taking examinations in Maths, Physics and Chemistry, each of the student has passed in at least one of the subject, 37 passed Maths, 24 Physics and 43 Chemistry. At most 19 passed Maths and Physics, at most 29 Maths and Chemistry and at most 20 Physics and Chemistry. What is the largest possible number that could have passed all three examinations?
- Draw the graph of the function, $f(x) = |x-1| + |1+x|$, $-2 \leq x \leq 2$.

OR

- Find the range of the function, $f(x) = 1 - |x-2|$.
 - Find the domain of the function, $f(x) = \frac{1}{1-2\cos x}$.
- For any triangle ABC , prove that, $\sin \frac{C-A}{2} = \frac{c-a}{b} \cos \frac{B}{2}$.
 - Using Principle of Mathematical Induction prove that, $1^2 + 2^2 + 3^2 + \dots + n^2 > \frac{n^3}{3}$, $n \in N$.

13. If r and s are different complex numbers with $|s|=1$, then find $\left| \frac{s-r}{1-\overline{r}s} \right|$.
14. Find the number of different words that can be formed from the letters of the word INTERMEDIATE such that two vowels never come together.
15. If all permutations of the letters of the word AGAIN are arranged in the order as in a dictionary, what is the 50th word?
16. What is the ratio of the coefficient of x^{15} to the term independent of x in the expansion of $\left(x^2 + \frac{2}{x}\right)^{15}$.

Section: C**(6 * 5 = 30)**

17. (a) Prove that, $\cos 2x \cos \frac{x}{2} - \cos 3x \cos \frac{9x}{2} = \sin 5x \sin \frac{5x}{2}$
- (b) If $\tan x = \frac{3}{4}$, $f < x < \frac{3f}{2}$, find the value of $\sin \frac{x}{2}$ and $\tan \frac{x}{2}$.
18. For all sets A, B and C prove that, $(A - B) \cap (C - B) = (A \cap C) - B$.
19. Solve graphically, $x + y \geq 1$, $x \leq 5$, $y \leq 4$, $2x + 3y \leq 12$, $x \geq 0$, $y \geq 0$.
20. (a) A convex polygon has 44 diagonals. Find the number of its sides.
- (b) What is the number of ways of choosing 4 cards from a pack of 52 playing cards? In how many of these
- four cards are of the same suit,
 - four cards belong to four different suits,
 - cards are of the same colour ?
21. Find the term independent of x in the expansion of $(1 + x + 2x^3) \left(\frac{3}{2}x^2 - \frac{1}{3x} \right)^9$.