



INDIAN SCHOOL AL WADI AL KABIR

Dept. of Mathematics

HOLIDAY HOME WORK

Class XI (2015-16)

Section A(1 mark)



1. Evaluate: $\tan\left(\frac{19\pi}{3}\right)$
2. Write all subsets of : $\{a, \{b\}\}$
3. If $(2x-1, 3y+2) = (5, 4)$, find x and y.
4. Evaluate: $\sin(-1410^\circ)$
5. If $f(x) = x^3 - \frac{1}{x^3}$ find $f(x) + f\left(\frac{1}{x}\right)$
6. If $f(x) = 3x+1$ and $g(x) = 3\tan x + \sec^2 x$ Then find $f(1) + g\left(\frac{\pi}{4}\right)$
7. Write in set-builder form: $A = \left\{\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}, \dots\right\}$
8. Write principal solution and general solution of $2\sin x + 1 = 0$
9. In ΔABC , $AB = 5\text{cm}$, $BC = 3\text{ cm}$ and $AC = 7\text{ cm}$. Find the measure of angle opposite to the largest side.
10. Convert in to radian measure: $47^\circ 36'$

Section B (4Marks)

11. If $f(x) = \frac{ax+b}{bx-a}$, prove that $f(f(x)) = x$
12. Let $U = \{x: x \leq 9, x \in N\}$; $A = \{1, 3, 5, 7, 9\}$; $B = \{2, 3, 5, 7\}$ and $C = \{1, 2, 3, 4, 5\}$.
Find : i) $A \cup (B \cap C)$ ii) $B - (A \cap C)$
iii) Verify: $(A \cup B)^c = A^c \cap B^c$
13. Find domain and range of the real functions: i) $|x - 2| - 2$ ii) $\sqrt{1-x}$
14. Solve : $\sin x + \sqrt{3}\cos x = 1$
15. If $3\sin x = 4\cos x$, $x \in III\text{quadrant}$, then evaluate $\sin \frac{x}{2}$, $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$
16. i) Find domain of the real function $f(x) = \frac{x^2}{x^2+5x+4}$
ii) Find range of the real function $f(x) = \frac{x^2}{1+x^2}$
17. Prove: $\frac{(\cos\theta - \cos 3\theta)(\sin 8\theta + \sin 2\theta)}{(\sin 5\theta - \sin \theta)(\cos 4\theta - \cos 6\theta)} = 1$

18. In any $\triangle ABC$, prove: $\frac{1+\cos(A-B)\cos C}{1+\cos(A-C)\cos B} = \frac{a^2 + b^2}{a^2 + c^2}$
19. Using principle of Mathematical Induction prove that :
- $$\frac{1}{3.5} + \frac{1}{5.7} + \frac{1}{7.9} \dots + \frac{1}{(2n+1)(2n+3)} = \frac{n}{3(2n+3)} \text{ for all } n \in \mathbb{N}$$
20. Prove: $\tan(x-y) + \tan(y-z) + \tan(z-x) = \tan(x-y)\tan(y-z)\tan(z-x)$

Section C (6 mark)

21. In a class of 150 students, 60 play football, 60 play hockey and 75 play cricket, 30 play hockey and cricket, 18 play foot ball and cricket, 28 play football and hockey and 8 play all the three games. Use Venn diagram to find number of students
- who do not play any of the three games.
 - who play only cricket
 - who play exactly two of the games
- iv) Comment on the importance of sports and games in school curriculum**
22. In any $\triangle ABC$, prove that: $a \sin(B - C) + b \sin(C - A) + c \sin(A - B) = 0$
23. Prove: $\frac{\cos A - \cos 3A - \cos 5A + \cos 7A}{\sin A - \sin 3A + \sin 5A - \sin 7A} = \tan 2A$
24. Prove : $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$
25. Using PMI prove: $2 \cdot 7^n + 3 \cdot 5^n - 5$ is divisible by 24 for all natural numbers.
26. Prove: $\frac{\cos 8A \cos 5A - \cos 12A \cos 9A}{\sin 8A \cos 5A + \cos 12A \sin 9A} = \tan 4A$
27. Write domain and range of the following: i) $\sqrt{9-x^2}$ ii) $\sqrt{x^2-9}$ iii) $\sqrt{x-4}$ iv) $\frac{1}{\sqrt{1-x^2}}$
28. Prove: $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$
29. In a survey of 200 students, it was found that 100 read magazine A, 80 read magazine B, 120 read magazine C, 35 read magazine A and B, 50 read magazine B and C and 45 read magazine A and C. If 20 read all the three magazines, find how many students read
- none of the three magazines
 - exactly two magazines
 - magazine C only?

Comment on the importance of reading habit.

30. Prove that $\cos^2 A + \cos^2(A + 240^\circ) + \cos^2(A - 240^\circ) = \frac{3}{2}$

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