



INDIAN SCHOOL AL WADI AL KABIR  
PO 513, PC 117, WADI KABIR, SULTANATE OF OMAN  
Department of Mathematics, 2018-2019

CLASS: XI

HOLIDAY HOMEWORK

28.05.2018

Q.No	Questions
1.	Evaluate: $\cos(-600^\circ)$ Ans: $-\frac{1}{2}$
2.	Write general solution of $\tan(x + \frac{\pi}{4}) = 1$ Ans: $x = n\pi, n \in \mathbb{Z}$
3.	Find range of the real function $f(x) = \frac{x^2}{1+x^2}$ Ans: $[0, 1)$
4.	$A = \{x: x^2 - 5x + 6 = 0\}$ and $B = \{x: 1 < x < 4, x \in \mathbb{N}\}$ . Is $A = B$ ? Why?      Ans: Yes
5.	If $f(x) = x^2 + 1$ and $g(x) = \tan^2 x + 1$ , then evaluate $f[g(\frac{\pi}{4})]$ .      Ans: 5
6.	Write domain and range of the function (i) $f(x) = \sqrt{9-x^2}$ (ii) $g(x) = 1 -  x $ Ans: $[-3, 3], [0, 3]$ (ii) $\mathbb{R}, (-\infty, 1]$
7.	Solve: $\sqrt{3}\tan^2 x + 1 = (\sqrt{3} + 1)\tan x$ .      Ans: $x = n\pi + \frac{\pi}{4}$ or $x = n\pi + \frac{\pi}{6}, n \in \mathbb{Z}$
8.	$f(x) = \begin{cases} 2x + 3, & 0 \leq x < 3 \\ 3x + 1, & 3 \leq x < 5 \\ x^2 + 1, & 5 \leq x < 8 \end{cases}$ , $x \in W$ . Write the function in roster form. Write Domain and Range of the function.
9.	In a triangle ABC, Prove that: $2(b \cos^2 \frac{C}{2} + c \cos^2 \frac{B}{2}) = a + b + c$ .
10.	Prove: $2\cos \frac{\pi}{13} \cos \frac{9\pi}{13} + \cos \frac{3\pi}{13} + \cos \frac{5\pi}{13} = 0$ .
11.	Prove: $(1 + \cos \frac{\pi}{8})(1 + \cos \frac{3\pi}{8})(1 + \cos \frac{5\pi}{8})(1 + \cos \frac{7\pi}{8}) = \frac{1}{8}$
12.	Let $U = \{x: x \leq 9, x \in \mathbb{N}\}$ ; $A = \{1, 3, 5, 7, 9\}$ ; $B = \{2, 3, 5, 7\}$ and $C = \{1, 2, 3, 4, 5\}$ Find : i) $A \cup (B \cap C)$ ii) $B - (A \cap C)$ Verify: $(A \cup B)' = A' \cap B'$
13.	Prove: $\sqrt{2 + \sqrt{2 + 2\cos 4x}} = 2\cos x$ .
14.	Solve the equation for general solution: $2\cos^2 x + 3\sin x = 0$ Ans: $x = n\pi + (-1)^n \frac{7\pi}{6}, n \in \mathbb{Z}$

15.	If $3\sin x = 4\cos x$ , $x$ lies in the third quadrant, find the values of $\sin \frac{x}{2}$ , $\cos \frac{x}{2}$ and $\tan \frac{x}{2}$ .  Ans: $\frac{3}{\sqrt{10}}$ , $-\frac{1}{\sqrt{10}}$ , $-3$
16.	Prove: (i) $\frac{\cos 8A \cos 5A - \cos 12A \cos 9A}{\sin 8A \cos 5A + \cos 12A \sin 9A} = \tan 4A$  (ii) Prove: $\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$ .
17.	In any $\Delta ABC$ , prove: $\frac{a^2 + b^2}{a^2 + c^2} = \frac{1 + \cos(A-B)\cos C}{1 + \cos(A-C)\cos B}$
18.	In a town of 10000 families, it was found that 40% families buy newspaper A, 20% families buy newspaper B and 10% families buy newspaper C. 5% families buy A and B, 3% buy B and C and 4% buy A and C. If 2% families buy all the three newspapers, find the number of families who buys i) A only, ii) C only iii) exactly two newspapers iv) none of A, B or C .  Ans. (i) 3300 (ii) 500 (iii) 600 (iv) 4000
19.	Prove: $\cos^2 A + \cos^2(A + 120^\circ) + \cos^2(A - 120^\circ) = \frac{3}{2}$
20.	Prove the following:  a) $\frac{\sin 5x - 2\sin 3x + \sin x}{\cos 5x - \cos x} = \tan x$ b) $\frac{\sin 3x + \sin 5x + \sin 7x + \sin 9x}{\cos 3x + \cos 5x + \cos 7x + \cos 9x} = \tan 6x$

Submission Date: 7th Aug 2018

All the Best!

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