ALLEN CAREER INSTITUTE KOTA (RAJASTHAN)

JAIPUR CENTER

Academic Session : 2020-21

MATHEMATICS	CLASS-XII

FUNCTION

1. Domain and range of $f(x) = \sin^{-1}(\cos^{-1}[x])$ where $[.]$ is G.I.F , are

   (A) $[1,2), \{0\}$

   (B) $[0,1], \{-1,0,1\}$

   (C) $[-1,1], \left\{0, \sin^{-1}\left(\dfrac{\pi}{2}\right), \sin^1(\pi)\right\}$

   (D) $[-1,1], \left\{-\dfrac{\pi}{2}, 0, \dfrac{\pi}{2}\right\}$

2. If $f(x) = \log_{[x-1]}\left(\dfrac{|x|}{x}\right)$ where $[.]$ is G.I.F then domain and range are

   (A) $(2,\infty), (0,1)$

   (B) $[3,\infty), \{0\}$

   (C) $[3,\infty), \{0,1\}$

   (D) $(-\infty, \infty); \{0\}$

3. Let $f(x)$ and $g(x)$ be bijective functions where $f : \{a,b,c,d\} \to \{1,2,3,4\}$ and $g : \{3,4,5,6\} \to \{w,x,y,z\}$ respecitvely. The no.of elements in the range set of $g(f(x))$ is

   (A) 1   (B) 2   (C) 3   (D) 4

4. The range of $f(x) = \dfrac{1}{|\sin x|} + \dfrac{1}{|\cos x|}$ is :

   (A) $[2\sqrt{2}, \infty)$

   (B) $(\sqrt{2}, 2\sqrt{2})$

   (C) $(0, 2\sqrt{2})$

   (D) $(2\sqrt{2}, 4)$

5. The range of $f(x) = \left[\dfrac{1}{\sin\{x\}}\right]$ is , where $\{.\}$ is fractional part and $[.]$ is G.I.F :

   (A) $\{1,-1\}$ (B) $\{0\}$ (C) N   (D) Z

6. The range of $f(x) = \dfrac{\tan\left(\pi[x^2 - x]\right)}{1 + \sin(\cos x)}$ where $[.]$ is G.I.F is :

   (A) $\left(0, \dfrac{\pi}{2}\right)$

   (B) $\{0,1\}$

   (C) $\{0\}$

   (D) $\left(-\dfrac{\pi}{2}, \dfrac{\pi}{2}\right)$

7. The range of $f(x) = \sqrt{a-x} + \sqrt{x-b}$ is $(\text{where } a > b > 0)$

   (A) $\left[\sqrt{a-b}, \sqrt{2(a-b)}\right]$

   (B) $\left[\sqrt{a-b}, \sqrt{(a+b)}\right]$

   (C) $[a,b]$

   (D) $(a, (B)$

8. The range of the function $f(x) = \log_{\sqrt{2}}\left(2 - \log_2(16\sin^2 x + 1)\right)$ is

(A) $(-\infty, 1)$ (B) $(-\infty, 2)$

(C) $(-\infty, 1)$ (D) $(-\infty, 2]$

9. If $f(x) = \pi\left(\dfrac{\sqrt{x+7}-4}{x-9}\right)$, then the range of function $y = \sin(2f(x))$ is :

(A) $[0, 1]$ (B) $\left(0, \dfrac{1}{\sqrt{2}}\right]$

(C) $\left(0, \dfrac{1}{\sqrt{2}}\right) \cup \left(\dfrac{1}{\sqrt{2}}, 1\right]$ (D) $(0, 1]$

10. If the range of function $f(x) = \dfrac{x^2 + x + c}{x^2 + 2x + c}, x \in R$ is $\left[\dfrac{5}{6}, \dfrac{3}{2}\right]$, then c is equal to

(A) -4 (B) 3 (C) 4 (D) 5

COMPREHENSION BASED QUESTIONS (11-15)

Let 'f' be a function satisfying $f(x) = \dfrac{a^x}{a^x + \sqrt{a}} = g_a(x)\,(a > 0)$

11. Let $f(x) = g_9(x)$ then the value of $\left[\displaystyle\sum_{r=1}^{1995} f\left(\dfrac{r}{1996}\right)\right] = $ where [.] is G.I.F

(A) 995   (B) 996   (C) 997   (D) 998

12. Let $f(x) = g_4(x)$ then $\displaystyle\sum_{r=1}^{1996} f\left(\dfrac{r}{1997}\right) = $

(A) 100   (B) even

(C) odd   (D) neither even nor odd

13. The value of $g_5(x) + g_5(1-x)$ is :

(A) 1   (B) 5   (C) 10   (D) 6

14. The value of $\displaystyle\sum_{r=1}^{2n-1} 2 \cdot f\left(\dfrac{r}{2n}\right) = $

(A) 0   (B) 2n-1   (C) 2n   (D) 2n-2

15. If the value of $\displaystyle\sum_{r=0}^{2n} f\left(\dfrac{r}{2n+1}\right) = \dfrac{1}{1+\sqrt{a}} + 987$ then the value of 'n' is :

(A) 493   (B) 494

(C) 987   (D) 988

MATRIX MATCH TYPE

16. Match the following functios with their ranges

COLUMN-I	COLUMN-II
(A) $f(x) = \log_3(5 + 4x - x^2)$	(p) function is not defined
(B) $f(x) = \log_3(x^2 - 4x - 5)$	(q) $[0, \infty)$
(C) $f(x) = \log_3(x^2 - 4x + 5)$	(r) $(-\infty, 2]$
(D) $f(x) = \log_3(4x - 5 - x^2)$	(s) R

SUBJECTIVE QUESTION :

17. Find domain and range of the function $y = \log_e(3x^2 - 4x + 5)$.

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ANSWER KEY

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	A	B	B	A	C	C	A	D	C	C

Que.	11	12	13	14	15	16	17
Ans.	C	B	A	B	C	(A)-r, (B)-s, (C)-q, (D)-p	$\left[\log\left(\frac{11}{3}\right), \infty\right)$