DPP

DAILY PRACTICE PROBLEMS

CLASS : XIIth **SUBJECT : MATHS**

DATE : **DPP NO. : 5**

Topic :- RELATIONS AND FUNCTIONS

1. Let $f:N\to Y$ be a function defined as $f(x)=4x+3$ where $Y=\{y\in N: y=4x+3 \text{ for some } x\in N\}$. Show that f is invertible and its inverse is

   a) $g(y)=\frac{y-3}{4}$ b) $g(y)=\frac{3y+4}{3}$ c) $g(y)=4+\frac{y+3}{4}$ d) $g(y)=\frac{y+3}{4}$

2. If $f(x)=\sqrt{\cos(\sin x)}+\sqrt{\sin(\cos x)}$, then range of $f(x)$ is

   a) $[\sqrt{\cos 1},\sqrt{\sin 1}]$ b) $[\sqrt{\cos 1},1+\sqrt{\sin 1}]$ c) $[1-\sqrt{\cos 1},\sqrt{\sin 1}]$ d) None of these

3. Let $f:A\to B$ and $g:B\to C$ be two functions such that $gof:A\to C$ is onto and g is one-one. Then,

   a) f is one-one
   b) f is onto
   c) f is both one-one and onto
   d) None of these

4. Let $f:(e,\infty)\to R$ be defined by $f(x)=\log[\log(\log x)]$, then

   a) f is one-one but not onto
   b) f is onto but not one-one
   c) f is both one-one and onto
   d) f is neither one-one nor onto

5. If $f:[-6,6]\to R$ is defined by $f(x)=x^2-3$ for $x\in R$, then $(fofof)(-1)+(fofof)(0)+(fofof)(1)$ is equal to

   a) $f(4\sqrt{2})$ b) $f(3\sqrt{2})$ c) $f(2\sqrt{2})$ d) $f(\sqrt{2})$

6. Let $f: R=\{n\}\to R$ be a function defined by $f(x)=\frac{x-m}{x-n}$, where $m\neq n$. Then,

   a) f is one-one onto b) f is one-one into c) f is many one onto d) f is may one into

7. Let $f(x)=x, g(x)=1/x$ and $h(x)=f(x)g(x)$. Then, $h(x)=1$, if

   a) x is any rational number
   b) x is a non-zero real number
   c) x is a real number
   d) x is a rational number

8. Which of the following is not periodic?

   a) $|\sin 3x|+\sin^2 x$ b) $\cos\sqrt{x}+\cos^2 x$ c) $\cos 4x+\tan^2 x$ d) $\cos 2x+\sin x$

9. If $f(x) = 2^x$, then $f(0), f(1), f(2), \ldots$ are in

a) AP b) GP c) HP d) Arbitrary

10. If $f(\sin x) - f(-\sin x) = x^2 - 1$ is defined for all $x \in R$, then the value of $x^2 - 2$ can be

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

11. If $x \in R$, then $f(x) = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ is equal to

a) $2\tan^{-1} x$

b) $\begin{cases} 2\tan^{-1} x, x \geq 0 \\ -2\tan^{-1} x, \ x \leq 0 \end{cases}$

c) $\begin{cases} \pi + 2\tan^{-1} x, \ x \geq 0 \\ -\pi + 2\tan^{-1} x, \ x \leq 0 \end{cases}$

d) None of these

12. Domain of the function $f(x) = \sin^{-1}(\log_2 x)$ in the set of real numbers is

a) $\{x : 1 \leq x \leq 2\}$ b) $\{x : 1 \leq x \leq 3\}$ c) $\{x : -1 \leq x \leq 2\}$ d) $\left\{x : \frac{1}{2} \leq x \leq 2\right\}$

13. If $f : R \to R$ and $g : R \to R$ are given by $f(x) = |x|$ and $g(x) = [x]$ for each $x \in R$, then $\{x \in R : g(f(x)) \leq f(g(x))\} =$

a) $Z \cup (-\infty, 0)$ b) $(-\infty, 0)$ c) Z d) R

14. If $f(x) = \log\left(\frac{1+x}{1-x}\right)$, $-1 < x < 1$, then $f\left(\frac{3x+x^3}{1+3x^2}\right) - f\left(\frac{2x}{1+x^2}\right)$ is

a) $[f(x)]^3$ b) $[f(x)]^2$ c) $-f(x)$ d) $f(x)$

15. The domain of definition of $f(x) = \underbrace{\log_{10} \log_{10} \log_{10} \ldots \log_{10}}_{\to n \text{ times} \leftarrow} x$, is

a) $(10^n, \infty)$ b) $(10^{n-1}, \infty)$ c) $(10^{n-2}, \infty)$ d) None of these

16. The domain of $\sin^{-1}\left[\log_3\left(\frac{x}{3}\right)\right]$ is

a) [1, 9] b) [-1, 9] c) [-9, 1] d) [-9, -1]

17. Domain of definition of the function $f(x) = \frac{3}{4-x^2} + \log_{10}(x^3 - x)$, is

a) $(1, 2)$ b) $(-1, 0) \cup (1, 2)$

c) $(1, 2) \cup (2, \infty)$ d) $(-1, 0) \cup (1, 2) \cup (2, \infty)$

18. If X and Y are two non-empty sets where $f : X \to Y$ is function is defined such that $f(C) = \{f(x) : x \in C\}$ for $C \subseteq X$

And $f^{-1}(D) = \{x : f(x) \in D\}$ for $D \subseteq Y$,

For any $A \subseteq X$ and $B \subseteq Y$, then

a) $f^{-1}(f(A)) = A$ b) $f^{-1}(f(A)) = A$ only if $f(X) = Y$

c) $f(f^{-1}(B)) = B$ only if $B \subseteq f(x)$ d) $f(f^{-1}(B)) = B$

19. If $f(-x) = -f(x)$, then $f(x)$ is

a) An even function b) An odd function c) Neither odd nor even d) Periodic function

20. If $f:[-2, 2] \to R$ is defined by

$$f(x) = \begin{cases} -1, \text{ for } -2 \leq x \leq 0 \\ x - 1, \text{ for } 0 \leq x \leq 2 \end{cases}$$

Then $\{x \in [-2,2]: x \leq 0 \text{ and } f(|x|) = x\} =$

a) $\{-1\}$ b) $\{0\}$ c) $\{-1/2\}$ d) ϕ