Holiday Home Work

MATHS

Class – XII (A+B)

Q.1. If $R = \{(x, y) : x + 2y = 8\}$ is a relation on N. write range of R.

Q.2. if $R = \{(a, a^3) : a$ is a prime number $< 5\}$ is a relation find range of R.

Q.3. Prove that the relation R on set $A = \{5, 6, 7, 8, 9\}$ given by $R = \{(a, b) : |a-b|$ is divisible by 2 is an equivalence relation. Also find all the elements related to element 6.

Q4. State reason for the relation R in the set $\{1, 2, 3\}$ given by $R = \{(1,2)\ (2,1)\}$ not to be transitive.

Q.5. Prove that the relation R defined on the set $N \times N$ by $(a, b) R (c, d) \Leftrightarrow a+d = b+c$ is an equivalence relation.

Q.6. if $A = \{1, 2, 3\}$, $B = \{4, 5, 6, 7\}$ and $f = \{(1, 4), (2, 5), (3, 6)\}$ be a function from A to B. ~~State~~ State whether f is one-one or not.

Q7. What is the range of the function $f(x) = \dfrac{|x-1|}{x-1}$.

Q.8. if $N \to N$ be defined by $f(n) = \begin{cases} \frac{n+1}{2} & \text{if } n \text{ is odd} \\ \frac{n}{2} & \text{if } n \text{ is even} \end{cases}$ $\forall\, n \in N$. find whether the function f is bijective.

Q.9 find gof and fog if $f : R \to R$ and $g : R \to R$ are defined as $f(x) = 5x + 2$, and $g(x) = x^2 + 6$.

Q.10. if $f : R \to R$ and $g : R \to R$ definded by $f(x) = 3x^2$ and $g(x) = x + 5$ find (i) fog (ii) $(gof)(7)$ (iii) gogof.

Q.11. find the principal value of the following.

(i) $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ (ii) $\cot^{-1}\left(-\frac{1}{\sqrt{3}}\right)$ (iii) $\sec^{-1}(-2)$ (iv) $\operatorname{cosec}^{-1}(2)$

Q.12. Evaluate: $\cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$

Q.13. Evaluate: $\tan^{-1}\left[2\cos\left(2\sin^{-1}\frac{1}{2}\right)\right]$

Q.14. Evaluate: $\sin\left[\text{arc}\cos\left(-\frac{1}{2}\right)\right]$

Q.15 Evaluate: $\sin^{-1} \sin\left(\frac{17\pi}{8}\right)$

Q.16 Evaluate: $\sec^2(\tan^{-1} 3) + \operatorname{cosec}^2(\cot^{-1} 2)$.

Q.17 Evaluate: $\tan\left[2\tan^{-1}\frac{1}{5}\right]$

Q.18 Evaluate: $\tan\left[2\tan^{-1}\left(\frac{1}{5}\right) + \frac{\pi}{4}\right]$

Q.19 Evaluate: $\sin\left(2\sin^{-1} 3/5\right)$

Q.20 Prove that: $2\sin^{-1}\frac{3}{5} - \tan^{-1}\frac{17}{31} = \frac{\pi}{4}$

Q.21 Prove that: $\cos\left[\sin^{-1}\frac{3}{5} + \cot^{-1}\frac{3}{2}\right] = \frac{6}{5\sqrt{13}}$.

Q.22 Prove that $\cot\left(\frac{\pi}{4} - 2\cot^{-1} 3\right) = 7$

Q.23 Prove that: $\cot^{-1} 7 + \cot^{-1} 8 + \cot^{-1} 18 = \cot^{-1} 3$.

Q.24 Evaluate: $\tan\left[\frac{1}{2}\sin^{-1} 3/5\right]$

Q.25 Solve: $\tan^{-1} x + 2\cot^{-1} x = 2\pi/3$

Q.26 Solve for x: $\tan^{-1}(x+1) + \tan^{-1}(x-1) = \tan^{-1}\frac{8}{31}$

Q.27 If $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $A^2 = pA$ find p.

Q.28 If $A = \begin{bmatrix} 2 & 3 & 1 \\ -1 & 0 & 2 \\ 1 & 1 & -1 \end{bmatrix}$ find $f(A)$ if $f(x) = x^2 - 5x + 7$

Q.29 If $(A-2I)(A-3I)$ where $A = \begin{bmatrix} 4 & 2 \\ -1 & x \end{bmatrix}$ and $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ find value of x.

Q.30 Write a 3×3 skew symmetric matrix.

Q.31 If A and B are symmetric matrices then Prove that $AB + BA$ is symmetric matrix.

Q.32 Prove that all the diagonal elements of of a ~~set~~ skew symmetric matrix are zero.

Q.33 If $A = \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix}$, then Prove that $A^{100} = 2^{99}A$.

Q.34 If $A = \begin{bmatrix} 0 & 2 \\ 3 & 4 \end{bmatrix}$ and $kA = \begin{bmatrix} 0 & 3a \\ 2b & 24 \end{bmatrix}$ find a, b and k

Q.35 find n if $A^2 = I - A$ and $A^n = 5A - 3I$ Ans $n=5$.

Note: