Functions,Linear Forms

LATEX

November 20, 2023

Functions

1. Let R be the relation defined in N, as $R = \{(x, y) : 2x + 3y = 15, x, y \in N\}$, then R= $\{\_\_\_\_\_, \_\_\_\_\_\}$.

2. If the function $f(x) = \begin{cases} \frac{k\cos x}{\pi - 2x}, & \text{if} x \neq \frac{\pi}{2} \\ 2, & \text{if} x = \frac{\pi}{2} \end{cases}$ is continuous at $x = \frac{\pi}{2}$, then the value of k is _____.

3. Show that the relation R in the set $\mathbb{R}$ of all real numbers,defined as $\mathbb{R} = \left\{(a, b) : a \leq b^2\right\}$ is neither reflexive nor symmetric.

4. Find the value of $\tan^{-1}\left[2\cos\left(2\sin^{-1}\left(\frac{1}{2}\right)\right)\right]$

5. Let a function $f : \mathbb{R} - \left\{\frac{-4}{3}\right\} \to \mathbb{R}$ be defined as $f(x) = \frac{4x}{3x+4}$.To show that f is one-one function. Hence, find the inverse of the function $f : \mathbb{R} - \left\{\frac{-4}{3}\right\} \to$ Range of f.

6. If $f : R \to R$ be given by $f(x) = \left(3 - x^3\right)^{1/3}$, then find $(fof)(x)$.

7. Let W denote the set of words in the English dictionary. Define the relation R by $R = (x, y) \in W \times W$ such x and y have at least one letter in common. Show that this relation R is reflexive and symmetric, but not transitive.

8. Find the inverse of the function $f(x) = \left(\frac{4x}{3x+4}\right)$