doubtnut
India's Number 1 Education App

MATHS

BOOKS - RD SHARMA MATHS (ENGLISH)

FUNCTION

Others

1. Find $gofandfog$ wehn $f: R\vec{R}$ and $g: R\vec{R}$ are defined by $f(x)=2x+3$ and$g(x)=x^2+5$ $f(x)=2x+x^2$ and $g(x)=x^3$ $f(x)=x^2+8$ and $g(x)=3x^3+1$ $f(x)=8x^3$ and $g(x)=x^{1/3}$

Watch Video Solution

2. Let $f=\{(1,\ -1),(4,\ -2),(9,\ -3),(16,4)\}$ and $g=\{(-1,\ -2),(02,\ -4),(-3,\ -6),(4,8)\}$. Show that gof is

defined while fog is not defined. Also, find gof.

Watch Video Solution

3. Show that if $f_1 and f_2$ are one-one maps from $R \to R$, then the product $f_1 \times f_2 : R \to R$ defined by $(f_1 \times f_2)(x) = f_1(x) f_2(x)$ need not be one-one.

Watch Video Solution

4. Give examples of two surjective function f_1 and f_2 from Z to Z such that $f_1 + f_2$ is not surjective.

Watch Video Solution

5. Given examples of two one-one functions $f_1 and f_2$ from R to R such that $f_1 + f_2 : R\overrightarrow{R}$, defined by $(f_1 + f_2)(x) = f_1(x) + f_2(x)$ is not one-one.

Watch Video Solution

6. If $f: A \rightarrow B$ and $g: B \rightarrow C$ are onto functions show that gof is an onto function.

Watch Video Solution

7. Show that the logarithmic function $f: R0 + \overrightarrow{R}$ given by $f(x) = (\log)_a x,\ a > 0$ is bijection.

Watch Video Solution

8. If $f: A\overrightarrow{B} andg: B\overrightarrow{C}$ are one-one functions, show that gof is one-one function.

Watch Video Solution

9. If $f: R \to R$ be the function defined by $f(x) = 4x^3 + 7$, show that f is a bijection.

Watch Video Solution

10. Let $A = \{1, 2, 3\}$. Write all one-one from A to itself.

Watch Video Solution

11. Show that $f: R\overrightarrow{R}$, given by $f(x) = x - [x]$, is neither one-one nor onto.

Watch Video Solution

12. Suppose $f_1 and f_2$ are non-zero one-one functions from $R \to R$. is $\frac{f_1}{f_2}$ necessarily one-one? Justify your answer. Here, $\frac{f_1}{f_2}: R \to R$ is given by $\left(\frac{f_1}{f_2}\right)(x) = \frac{f_1(x)}{f_2(x)}$ for all $x \in R$.

Watch Video Solution

13. Let $f = \{(3, 1), (9, 3), (12, 4)\}$ and g $= \{(1, 3), (3, 3), (4, 9), (5, 9)\}$. Show that gof and fog are both defined. Also, find fog and gof.

Watch Video Solution

14. Find $fog(2)$ and $gof(1)$ when: $f: R \to R; f(x) = x^2 + 8$ and $g: R \to R; g(x) = 3x^3 + 1$.

Watch Video Solution

15. Let $f: R\vec{R}$ and $g: R\vec{R}$ be defined by $f(x) = x^2$ and $g(x) = x + 1$. Show that $fog \neq gof$.

Watch Video Solution

16. Let R^+ be the set of all non-negative real numbers. if $f: R^+ \rightarrow R^+$ and $g: R^+ \rightarrow R^+$ are defined as $f(x) = x^2$ and $g(x) = +\sqrt{x}$. Find fog and gof. Are they equal functions.

Watch Video Solution

17. Let L be the line of intersection of the planes $2x + 3y + z = 1$ and $x + 3y + 2z = 2$. If L makes an angles α with the positive x-axis, then cosα equals

Watch Video Solution

18. Let $f: R \rightarrow R$ and $g: R \rightarrow R$ be defined by $f(x) = x + 1$ and $g(x) = x - 1$. Show that $fog = gof = I_R$.

Watch Video Solution

19. Show that the exponential function $f: R \rightarrow R$, given by $f(x) = e^x$, is one-one but not onto. What happens if the co-domain is replaced by R_0^+ (set of all positive real numbers).

Watch Video Solution

20. Let $A = \{-1, 0, 1) and f = \{(x, x^2) : x A\}$. Show that $f: A \vec{A}$ is neither one-one nor onto.

Watch Video Solution

21. If $f: A \vec{B}$ is an injection such that range of $f = \{a\}$. Determine the number of elements in A.

Watch Video Solution

22. Which of the following functions from $A \to B$ are one-one and onto? $f_1 = \{(1, 3), (2, 5), (3, 7)\}; A = \{1, 2, 3\}, B = \{3, 5, 7\}$

$f_2 = \{(2, a), (3, b), (4, c)\}; A = \{2, 3, 4\}, B = \{a, b, c\}$

$f_3 = \{(a, x), (b, x), (c, z), (d, z)\}; A = \{a, b, c, d\}, B = \{x, y, z\}$

Watch Video Solution

23. Prove that the function $F: N \to N,$ defined by $f(x) = x^2 + x + 1$ is one-one but not onto.

Watch Video Solution

24. Let A be any non-empty set. Then, prove that the identity function on set A is a bijection.

Watch Video Solution

25. Let $A = R - [2]\,and\,B = R - [1]$. If $f: A \to B$ is a mapping defined by $f(x) = \frac{x-1}{x-2}$, show that f is bijective.

Watch Video Solution

26. Show that if $f_1 and f_1$ are one-one maps from $R \to R$, then the product $f_1 x f_2 : R\overrightarrow{R}$ defined by $(f_1 x f_2)(x) = f_1(x) f_2(x)$ need not be one-one.

Watch Video Solution

27. Give examples of two one-one functions f_1 and f_2 from R to R such that $f_1 + f_2 : R \to R$, defined by $(f_1 + f_2)(x) = f_1(x) + f_2(x)$ is not one-one.

Watch Video Solution

28. If $f, g: R - R$ are defined respectively by $f(x) = x^2 + 3x + 1, g(x) = 2x - 3,$ find fog (ii) gof (iii) fof (iv) gog.

Watch Video Solution

29. If the function $f: R\overrightarrow{R}$ be given by $f(x) = x^2 + 2andg: R\overrightarrow{R}$ be given by $g(x) = \dfrac{x}{x-1}$. Find $fogandgof$.

Watch Video Solution

30. If the function $fandg$ are given by $f = \{(1, 2), (3, 5), (4, 1)\}andg = ((2, 3), (5, 1), (1, 3)\},$ find range of $fandg$. Also, write down $fogandgof$ as sets of ordered pairs.

Watch Video Solution

31. Suppose $f_1 and f_2$ are non=zero one-one functions from $R \rightarrow R$. is $\frac{f_1}{f_2}$ necessarily one-one? Justify your answer. Here, $\frac{f_1}{f_2} : R\overrightarrow{R}$ is given by $\left(\frac{f_1}{f_2}\right)(x) = \frac{f_1(x)}{f_2(x)}$ for all xR.

Watch Video Solution

32. Find whether the following functions are one-one or not:

$f : R\overrightarrow{g}ivenbyf(x) = x^3 + 2f\text{ or }allx \in R$.

$f : Z\overrightarrow{Z}givenbyf(x) = x^2 + 1f\text{ or }allx \in Z$.

Watch Video Solution

33. If the function f and g are given by $f = \{(1, 2), (3, 5), (4, 1)\}$ and $g = \{(2, 3), (5, 1), (1, 3)\}$, find range of f and g. Also write down fog and gofas set of ordered pairs.

Watch Video Solution

34. Discuss the surjectivity of the following functions: $f: R \rightarrow$ given by $f(x) = x^3 + 2$for all $x \in R$.

Watch Video Solution

35. Show that the function $f: Z\overrightarrow{Z}$ defined by $f(x) = x^2 + x$ for all $x \in Z$, is a many one function.

Watch Video Solution

36. Let A be the set of all 50 students of class XII in a central school. Let $f: A \rightarrow N$ be a function defined by $f(x)$=Roll number of student x. Show that f is one-one but not onto

Watch Video Solution

37. Show that the function $f: \overrightarrow{RR}$ defined by $f(x) = 3x^3 + 5$ for all $x \in R$ is a bijection.

Watch Video Solution

38. Show that the function $f: \overrightarrow{RR}$ given by $f(x) = \cos x f \text{ or } allx \in R,$ is neither one-one nor onto

Watch Video Solution

39. Show that the function $f: R^{\rightarrow}$ given by $f(x) = xa + b,$ where $a, b \in R, a \neq 0$ is a bijection.

Watch Video Solution

40. If $f(x) = \dfrac{x}{\sqrt{1+x^2}}$ then $fofof(x)$

Watch Video Solution

Watch Video Solution

41. If $f(x) = \frac{3x - 2}{2x - 3}$, prove that $f(f(x)) = x$ for all $x \in R - \left\{\frac{3}{2}\right\}$

.

Watch Video Solution

42. Show that $f: R\overrightarrow{R}$, given by $f(x) = x - [x]$, is neither one-one nor onto.

Watch Video Solution

43. Let $f: R - R$ be a function given by $f(x) = ax + b$ for all $x \in R$. Find the constants a and b such that $fof = I_R$.

Watch Video Solution

44. If $f(x) = e^x$ and $g(x) = (\log)_e x (x > 0)$, find $fogandgof\cdot$ Is $fog = gof$?

Watch Video Solution

45. If $f: [0, \infty)\vec{R}\,andg: R\vec{R}$ be defined as $f(x) = \sqrt{x}$ and $g(x) = -x^2 - 1$, then find $gofandfog\cdot$

Watch Video Solution

46. Let f and g be real functions defined by $f(x) = \dfrac{x}{x+1} andg(x) = \dfrac{1}{x+3}\cdot$ Describe the functions gof and fog (if they exist).

Watch Video Solution

47. If $f(x) = \sqrt{x}(x > 0)$ and $g(x) = x^2 - 1$ are two real functions, find fog and gof is $fog = gof$?

Watch Video Solution

48. Let $f: N - [1]\overrightarrow{N}$ be defined by, $f(n) =$ the highest prime factor of n . Show that f is neither one-one nor onto. Find the range of f.

Watch Video Solution

49. If $f: R^{\rightarrow}$ is defined by $f(x) = 2x + 7$. Prove that f is a bijection. Also, find the inverse of f.

Watch Video Solution

50. If $f: \left(-\frac{\pi}{2}, \frac{\pi}{2}\right) \rightarrow R$ and $g: [-1, 1] \rightarrow R$ be defined as $f(x) = \tan x$ and $g(x) = \sqrt{1 - x^2}$ respectively. Describe fog and gof

Watch Video Solution

51. If $f(x) = \sin^2 x + \sin^2\left(x + \frac{\pi}{3}\right) + \cos x \cos\left(x + \frac{\pi}{3}\right) and g\left(\frac{5}{4}\right) = 1$, then $(gof)(x)$ is __________

Watch Video Solution

52. Let $f, g: R - R$ be two functions defined as $f(x) = |x| + x$ and $g(x) = |x| - x$, for all x Then find fog and gof.

Watch Video Solution

53. Let $A = \{a, b, c, d\}$ and $f: A \to A$ be given by $f = \{(a, b), (b, d), (c, a), (d, c)\}$, write f^{-1}

Watch Video Solution

54. Let $f = \{(3, 1), (9, 3), (12, 4)\}$ and $g = \{(1, 3), (3, 3), (4, 9), (5, 9)\}$. Show that $gofandfog$ are both defined. Also, find $fogandgof$.

Watch Video Solution

55. If $F : [1, \infty) \rightarrow [2, \infty)$ is given by $f(x) = x + \frac{1}{x}, then\ f^{-1}(x)$ equals (a) $\frac{x + \sqrt{x^2 - 4}}{2}$ (b) $\frac{x}{1 + x^2}$ (c) $\frac{x - \sqrt{x^2 - 4}}{2}$ (d) $1 + \sqrt{x^2 - 4}$

Watch Video Solution

56. Let $f : R \rightarrow R$ and $g : R \rightarrow R$ be two functions such that $fog(x) = \sin x^2$ and $gof(x) = \sin^2 x$ Then, find $f(x)$ and $g(x)$.

Watch Video Solution

57. Let R be the set of real numbes. If $f:\overrightarrow{RR};f(x)=x^2$ and $g:\overrightarrow{RR};g(x)=2x+1$. Then, find $fogandgof$. Also, show that $fog\ne gof$.

Watch Video Solution

58. If $f(x)=\ -4-(x-7)^3$, write $f^{-1}(x)$.

Watch Video Solution

59. If $f:\{5,6\}\overrightarrow{2,3}andg:\{2,3\},\overrightarrow{5,6}$ are given by $f=\{(5,2),(6,3)\}$ and $g=\{(2,5),(3,6)\}$, find fog.

Watch Video Solution

60. If a function $g=\{(1,1),(2,3),(3,5),(4,7)\}$ is described by $g(x)=\alpha x+\beta$, find the values of $\alpha and\beta$.

Watch Video Solution

61. Show that $f: R - [0] \rightarrow R - [0]$ given by $f(x) = \frac{3}{x}$ is invertible and it is inverse of itself.

Watch Video Solution

62. Let $A = \{1, 2, ..., n\}$ and $B = \{a, b\}$. Then number of surjections from A into B is nP2 (b) $2^n - 2$ (c) $2^n - 1$ (d) nC2

Watch Video Solution

63. If $f: \overrightarrow{R - 1, 1}$ is defined by $f(x) = -\frac{x|x|}{1 + x^2}, then f^{-1}(x)$ equals $\sqrt{\frac{|x|}{1 - |x|}}$ (b) $-sgn(x)\sqrt{\frac{|x|}{1 - |x|}}$ $-\sqrt{\frac{x}{1 - x}}$ (d) none of these

Watch Video Solution

64. Let $f: Z \rightarrow Z$ be defined by $f(n) = 3n$ for all $n \in Z$ and $g: Z \rightarrow Z$ be defined by $g(n) = \begin{cases} \frac{n}{3} & \text{if } n \text{ is a multiple of } 3 \\ 0 & \text{if } n \text{ is not multiple of } 3 \end{cases}$ for all $n \in Z$ Show that $gof = I_Z$ and $fog \neq I_Z$

Watch Video Solution

65. Let $A = \{x \in R: 0 \leq x \leq 1\}$. If $f: A \rightarrow A$ is defined by $f(x) = \begin{cases} x & \text{if } x \in Q \\ 1 - x & \text{if } x \notin Q \end{cases}$ then prove that $fof(x) = x$ for all $x \in A$.

Watch Video Solution

66. Let $A = [-1, 1]$. Then, discuss whether the following functions from A to itself are one-one onto or bijective: $f(x) = \frac{x}{2}$ (ii) $g(x) = |x|$ (iii) $h(x) = x^2$

Watch Video Solution

67. Let R be a relation on the set A of ordered pairs of positive integers defined by $(x, y)\mathrm{R}(u, v)$ if and only if $xv = yu$. Show that R is an equivalence relation.

Watch Video Solution

68. Let A be a finite set. If $f : A\vec{A}$ is an onto function, show that f is one-one also.

Watch Video Solution

69. Show that the function $f : R - \{3\} \rightarrow R - \{1\}$ given by $f(x) = \dfrac{x-2}{x-3}$ is bijection.

Watch Video Solution

70. Show that the function $f : R \overrightarrow{}$ R given by $f(x) = x^3 + x$ is a bijection.

Watch Video Solution

71. Let $f : N \cup \{0\} \rightarrow N \cup \{0\}$ be defined by $f = \begin{cases} n+1 & \text{if } \quad n \, is \, even \\ n-1 & \text{if } \quad n \, is \, odd \end{cases}$ Show that f is a bijection.

Watch Video Solution

72. Let $f : N - [1] \overrightarrow{N}$ be defined by, $f(n) =$ the highest prime factor of n . Show that f is neither one-one nor onto. Find the range of f.

Watch Video Solution

73. Let $A = \{1, 2\}$. Find all one-to-one function from A to A.

Watch Video Solution

Watch Video Solution

74. Let $f: R \vec{a} ndg: R\vec{R}$ be defined by $f(x) = x + 1andg(x) = x - 1.$ Show that $fog = gof = I_R.$

Watch Video Solution

75. Verify assoiativity for the following three mappings : $f: N \rightarrow Z_0$ (the set of non zero integers), $g: Z_0 \rightarrow Q$ and $h: Q \rightarrow R$ given by $f(x) = 2x$, $g(x) = \frac{1}{x}$ and $h(x) = e^x.$

Watch Video Solution

76. If the set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is

Watch Video Solution

77. If the set A contains 7 elements and the set B contains 10 elements, then the number of one-one functions from A to B is

Watch Video Solution

78. $f: R \rightarrow R$ is defined by $f(x)=\dfrac{e^{x^2}-e^{-x^2}}{e^{x^2}+e^{-x^2}}$ is :

A. (a) one-one but not onto

B. (b) many-one but onto

C. (c) one-one and onto

D. (d) neither one-one nor onto

Answer: null

Watch Video Solution

79. The inverse of the function $f: R\overrightarrow{x \in R: x<1}$ given by $f(x)=\dfrac{e^x-e^{-x}}{e^x+e^{-x}}$, is(a) $\dfrac{1}{2}\dfrac{\log(1+x)}{1-x}$ (b) $\dfrac{1}{2}\dfrac{\log(2+x)}{2-x}$

$\frac{1}{2}\frac{\log(1-x)}{1+x}$ (d) None of these

Watch Video Solution

80. Let $A = \{1, 2, 3\}$. Write all one-one from A to itself.

Watch Video Solution

81. If $f : \overrightarrow{RR}$ be the function defined by $f(x) = 4x^3 + 7$, show that f is a bijection.

Watch Video Solution

82. If the function $f : [1, \infty) \rightarrow [1, \infty)$ is defined by $f(x) = 2^{x(x-1)}$, then $f^{-1}(x)$ is (A) $\left(\frac{1}{2}\right)^{x(x-1)}$ (B) $\frac{1}{2}\sqrt{1 + 4\log_2 x}$ (C) $\frac{1}{2}\left(1 + \sqrt{1 + 4\log_2 x}\right)$ (D) not defined

Watch Video Solution

83. The value of parameter α, for which the function $f(x) = 1 + \alpha x, \alpha \neq 0$ is the inverse of itself

Watch Video Solution

84. Let R^{+} be the set of all non-negative real numbers. if $f: R^{+} \rightarrow R^{+}$ and $g: R^{+} \rightarrow R^{+}$ are defined as $f(x) = x^2$ and $g(x) = +\sqrt{x}$. Find fog and gof. Are they equal functions.

Watch Video Solution

85. Show that the function $f: R \rightarrow R$ is given by $f(x) = 1 + x^2$ is not invertible.

Watch Video Solution

86. $\int_0^{\frac{\pi}{2}} \frac{2^{\sin x}}{2^{\sin x} + 2^{\cos x}} dx$

Watch Video Solution

87. Let $f: [-1, \infty]\overrightarrow{-1,}$ is given by $f(x) = (x+1)^2 - 1, x \geq -1$. Show that f is invertible. Also, find the set $S = \{x : f(x) = f^{-1}(x)\}$.

Watch Video Solution

88. Let $f : N\vec{R}$ be a function defined as $f(x) = 4x^2 + 12x + 15$. Show that $f : N\vec{S}$, where S is the range of f, is invertible. Also find the inverse of f

Watch Video Solution

89. Let $A = R - \{3\}$ and $B = R - [1]$. Consider the function $f : A\vec{B}$ defined by $f(x) = \left(\frac{x-2}{x-3}\right)$. Show that f is one-one and onto and

hence find f^{-1}

Watch Video Solution

90. Let $f, g : \vec{R}$ be defined by $f(x) = 2x + 1$ and $g(x) = x^2 - 2$ for all $x \in R,$ respectively. Then, find gof

Watch Video Solution

91. Let A and B be any two sets such that n(B)=P, n(A)=q then the total number of functions f:$A \rightarrow B$ is equal to

Watch Video Solution

92. If $f : A \rightarrow A, g : A \rightarrow A$ are two bijections, then prove that (i) fog is an injection (ii) fog is a surjection.

Watch Video Solution

93. Let $f: Z \rightarrow Z$ be defined by $f(x) = x + 2$. Find $g: Z \rightarrow Z$ such that $gof = I_Z$.

Watch Video Solution

94. Which one the following relations on $A = \{1, 2, 3\}$ is function?

$f = \{(1, 3), (2, 3), (3, 2)\}, g = \{(1, 2), (1, 3), (3, 1)\}$

Watch Video Solution

95. Write the domain of the real function f defined by $f(x) = \sqrt{25 - x^2}$.

Watch Video Solution

96. Let $A\Big\}x: -1 \leq x \leq 1\Big\}andf: A^{\rightarrow}$ A such that $f(x) = x|x|$, then f is (a) bijection (b) injective but not surjective Surjective but not injective (d) neither injective nor surjective

Watch Video Solution

97. If the function $f:[1,\infty)\to[1,\infty)$ is defined by $f(x)=2^{x(x-1)}, then f^{-1}(x)$ is $\left(\frac{1}{2}\right)^{x(x-1)}$ (b) $\frac{1}{2}\left(1+\sqrt{1+4(\log)_2 x}\right)$ $\frac{1}{2}\left(1-\sqrt{1+(\log)_2 x}\right.$ (d) not defined

Watch Video Solution

98. If $f(x)=\frac{x-1}{x+1}, x\neq -1,$ then show that $f(f(x))=-\frac{1}{x}$ provided that `x != 0,-1

Watch Video Solution

99. Let f be a real function defined by $f(x)=\sqrt{x-1.}$ Find $(fofof)(x)\cdot$ Also, show that $fof\neq f^2\cdot$

Watch Video Solution

100. Let $f: R \rightarrow R$ be the function defined by $f(x) = 4x - 3$ for all $x \in R$. Then write f^{-1}.

Watch Video Solution

101. Find whether $f: R \rightarrow R$ given by $f(x) = x^3 + 2$ for all $x \in R$.

Watch Video Solution

102. Find whether $f: Z \rightarrow Z$ given by $f(x) = x^2 + 1$ for all $x \in Z$

Watch Video Solution

103. Show that the function $f: Z \rightarrow Z$ defined by $f(x) = x^2$ for all $x \in Z$, is a function but not bijective function.

Watch Video Solution

104. Discuss the surjectivity of $f: R \to R$ given by $f(x) = x^3 + 2$ for all $x \in R$

Watch Video Solution

105. Discuss the surjectivity of $f: R \to R$ given by $f(x) = x^2 + 2$ for all $x \in R$

Watch Video Solution

106. Discuss the surjectivity of $f: Z \to Z$ given by $f(x) = 3x + 2$ for all $x \in Z$.

Watch Video Solution

107. Show that the function $f: N \rightarrow N$ given by $f(1) = f(2) = 1$ and $f(x) = x - 1$ for every $x \geq 2$, is onto but not one-one.

Watch Video Solution

108. Show that the Signum function $f: R \rightarrow R$, given by $f(x) = \left(\begin{cases} 1 & x > 0 \\ 0 & x = 0 \\ -1 & x < 0 \end{cases}\right)$ is neither one-one nor onto

Watch Video Solution

109. Prove that the function $f: Q \rightarrow Q$ given by $f(x) = 2x - 3$ for all $x \in Q$ is a bijection.

Watch Video Solution

110. Show that the function $f: R \to R$ defined by $f(x) = 3x^3 + 5$ for all $x \in R$ is a bijection.

Watch Video Solution

111. Let $A = \{x \in R: -1 \leq x \leq 1\} = B$. Then, the mapping $f: A \to B$ given by $f(x) = x|x|$ is (a) injective but not surjective (b) surjective but not injective (c) bijective (d) none of these

Watch Video Solution

112. Let A be the set of all 50 students of class XII in a central school. Let $f: A \to N$ be a function defined by $f(x) = Roll\nu mberofstudentx$ Show that f is one-one but not onto.

Watch Video Solution

113. Show that the function $f: N \rightarrow N$, given by $f(x) = 2x$, is one-one but not onto.

Watch Video Solution

114. Prove that $f: R \rightarrow R$, given by $f(x) = 2x$, is one-one and onto.

Watch Video Solution

115. Show that the function $f: R \rightarrow R$, defined as $f(x) = x^2$, is neither one-one nor onto.

Watch Video Solution

116. Show that $f: R \rightarrow R$, defined as $f(x) = x^3$, is a bijection.

Watch Video Solution

117. Show that the function $f: R_0 \to R_0$, defined as $f(x) = \frac{1}{x}$, is one-one onto, where R_0 is the set of all non-zero real numbers. Is the result true, if the domain R_0 is replaced by N with co-domain being same as R_0 ?

Watch Video Solution

118. Prove that the greatest integer function $f: \mathbb{R} \to \mathbb{R}$, given by $f(x) = [x]$, is neither one-one nor onto, where [x] denotes the greatest integer less than or equal to x.

Watch Video Solution

119. Show that the modulus function $f: R \to R$, given by $f(x) = |x|$ is neither one-one nor onto.

Watch Video Solution

120. Let C be the set of complex numbers. Prove that the mapping $F: C \rightarrow R$ given by $f(z) = |z|, \forall z \in C,$ is neither one-one nor onto.

Watch Video Solution

121. Show that the function $f: R^{\rightarrow}$ given by $f(x) = xa + b,$ where $a, b \in R, a \neq 0$ is a bijection.

Watch Video Solution

122. Show that the function $f: R \rightarrow R$ given by $f(x) = \cos x$ for all $x \in R$, is neither one-one nor onto.

Watch Video Solution

123. Let $A = R - \{2\}$ and $B = R - \{1\}$. If $f: A \rightarrow B$ is a mapping defined by $f(x) = \dfrac{x-1}{x-2}$, show that f is bijective.

Watch Video Solution

124. Let A and B be two sets. Show that $f: A \times B \rightarrow B \times A$ defined by $f(a, b) = (b, a)$ is a bijection.

Watch Video Solution

125. Let A be any non-empty set. Then, prove that the identity function on set A is a bijection.

Watch Video Solution

126. Let $f: N - \{1\} \rightarrow N$ be defined by, $f(n) =$ the highest prime factor of n. Show that f is neither one-one nor onto. Find the range of f.

Watch Video Solution

127. Let $A = \{1, 2\}$. Find all one-to-one function from A to A.

Watch Video Solution

128. Consider the identity function $I_N : N \to N$ defined as, $I_N(x) = x$ for all $x \in N$. Show that although I_N is onto but $I_N + I_N : N \to N$ defined as $(I_N + I_N)(x) = I_N(x) + I_N(x) = x + x = 2x$ is not onto.

Watch Video Solution

129. Consider a function $f: \left[0, \frac{\pi}{2}\right] \to R$ given by $f(x) = \sin x$ and $g: \left[0, \frac{\pi}{2}\right] \to R$ given by $g(x) = \cos x$. Show that f and g are one-one, but $f + g$ is not one-one.

Watch Video Solution

130. Let $f: X \to Y$ be a function. Define a relation R in X given by $R = \{(a, b): f(a) = f(b)\}$. Examine whether R is an equivalence relation or not.

Watch Video Solution

131. Show that the function $f: R \to \{x \in R: -1 < x < 1\}$ defined by $f(x) = \dfrac{x}{1 + |x|}, x \in R$ is one-one and onto function.

A. defined by $f(x) = \dfrac{x}{1 + |x|}, x \in R$ is one-one and onto function.

B. null

C. null

D. null

Answer: null

Watch Video Solution

132. Show that the function $f: R \rightarrow R$ given by $f(x) = x^3 + x$ is a bijection.

Watch Video Solution

133. check that $f: N - N$ defined by $f(n) = \left\{\frac{n+1}{2}, \left(\text{ if } nisodd\right)\right), \left(\frac{n}{2}, \left(\text{ if } niseven\right)\right)$ is one -one onto function ?

Watch Video Solution

134. Show that the function $f: N \rightarrow N$ given by, $f(n) = n - (-1)^n$ for all $n \in N$ is a bijection.

Watch Video Solution

135. Let $f: N \cup \{0\} \to N \cup \{0\}$ be defined by $f(n) = \{n + 1, \quad \text{if} \quad n\,is\,eve \cap - 1, \quad \text{if} \quad n\,is\,odd$ Show that f is a bijection.

Watch Video Solution

136. Let A be a finite set. If $f: A \to A$ is a one-one function, show that f is onto also.

Watch Video Solution

137. Let A be a finite set. If $f: A \to A$ is an onto function, show that f is one-one also.

Watch Video Solution

138. Give an example of a function which is one-one but not onto. which is not one-one but onto. (iii) which is neither one-one nor onto.

Watch Video Solution

139. Which of the following functions from A to B are one-one and onto? $f_1 = \{(1, 3), (2, 5), (3, 7)\};\ A = \{1, 2, 3\},\ B = \{3, 5, 7\}$ (ii) $f_2 = \{(2, a), (3, b), (4, c)\};\ A = \{2, 3, 4\},\ B = \{a, b, c\}$ (iii) $f_3 = \{(a, x), (b, x), (c, z), (d, z)\};\ A = \{a, b, c, d\},\ B = \{x, y, z\}$

Watch Video Solution

140. Prove that the function $f: N \rightarrow N$, defined by $f(x) = x^2 + x + 1$ is one-one but not onto.

Watch Video Solution

141. Let $A = \{-1, 0, 1\}$ and $f = \{(x, x^2) : x \in A\}$. Show that $f : A \to A$ is neither one-one nor onto.

Watch Video Solution

142. Classify $f : N \to N$ given by $f(x) = x^2$ as injection, surjection or bijection.

Watch Video Solution

143. Classify $f : Z \to Z$ given by $f(x) = x^2$ as injection, surjection or bijection.

Watch Video Solution

144. Classify $f : N \to N$ given by $f(x) = x^3$ as injection, surjection or bijection.

Watch Video Solution

145. Classify $f: Z \to Z$ given by $f(x) = x^3$ as injection, surjection or bijection.

Watch Video Solution

146. Classify $f: R \to R$, defined by $f(x) = |x|$ as injection, surjection or bijection.

Watch Video Solution

147. Classify $f: Z \to Z$, defined by $f(x) = x^2 + x$ as injection, surjection or bijection.

Watch Video Solution

148. Classify $f: Z \to Z$, defined by $f(x) = x - 5$ as injection, surjection or bijection.

Watch Video Solution

149. Classify $f: R \to R$, defined by $f(x) = \sin x$ as injection, surjection or bijection.

Watch Video Solution

150. Classify $f: R \to R$, defined by $f(x) = x^3 + 1$ as injection, surjection or bijection.

Watch Video Solution

151. Classify $f: R \to R$, defined by $f(x) = x^3 - x$ as injection, surjection or bijection.

Watch Video Solution

152. Classify $f: R \rightarrow R$, defined by $f(x) = \sin^2 x + \cos^2 x$ as injection, surjection or bijection.

Watch Video Solution

153. Classify $f: Q - \{3\} \rightarrow Q$, defined by $f(x) = \dfrac{2x+3}{x-3}$ as injection, surjection or bijection.

Watch Video Solution

154. Find $\dfrac{dy}{dx}$ if $y^7 = x$

Watch Video Solution

155. Find $\dfrac{dy}{dx}$ if $y^3 = x$

Watch Video Solution

156. Classify $f: R \rightarrow R$, defined by $f(x) = 3 - 4x$ as injection, surjection or bijection.

Watch Video Solution

157. Classify $f: R \rightarrow R$, defined by $f(x) = 1 + x^2$ as injection, surjection or bijection.

Watch Video Solution

158. Classify $f: R \rightarrow R$, defined by $f(x) = \dfrac{x}{x^2 + 1}$ as injection, surjection or bijection.

Watch Video Solution

159. If $f: A \rightarrow B$ is an injection such that range of $f = \{a\}$. Determine the number of elements in A.

Watch Video Solution

160. Show that the function $f: R - \{3\} \rightarrow R - \{1\}$ given by $f(x) = \frac{x-2}{x-3}$ is a bijection.

Watch Video Solution

161. Let $A = [-1, 1]$. Then, discuss whether the following functions from A to itself are one-one, onto or bijective: $f(x) = \frac{x}{2}$ (ii) $g(x) = |x|$ (iii) $h(x) = x^2$

Watch Video Solution

162. Are the following set of ordered pairs functions? If so, examine whether the mapping is injective or surjective: $\{(x,\ y) : x$ is a person, y is the mother of $x\}$ (ii) $\{(a,\ b) : a$ is a person, b is an ancestor of $a\}$

Watch Video Solution

163. Let $A = \{1,\ 2,\ 3\}$. Write all one-one from A to itself.

Watch Video Solution

164. If $f : R \to R$ be the function defined by $f(x) = 4x^3 + 7$, show that f is a bijection.

Watch Video Solution

165. Show that the exponential function $f : R \to R$, given by $f(x) = e^x$, is one-one but not onto. What happens if the co-domain is replaced by

$R0+$ (set of all positive real numbers).

Watch Video Solution

166. Show that the logarithmic function $f: R0 \pm > R$ given by $f(x) = (\log)_a x, \ a > 0$ is a bijection.

Watch Video Solution

167. Show that a one-one function $f: \{1, 2, 3\} \to \{1, 2, 3\}$must be onto.

Watch Video Solution

168. If $A = \{1, \ 2, \ 3\}$, show that an onto function $f: A \to A$ must be one-one

Watch Video Solution

169. Find the number of all onto functions from the set $A = \{1, 2, 3, , n\}$ to itself.

Watch Video Solution

170. Give examples of two one-one functions f_1 and f_2 from R to R such that $f_1 + f_2 : R \to R$, defined by $(f_1 + f_2)(x) = f_1(x) + f_2(x)$ is not one-one.

Watch Video Solution

171. Give examples of two surjective function f_1 and f_2 from Z to Z such that $f_1 + f_2$ is not surjective.

Watch Video Solution

172. Show that if f_1 and f_2 are one-one maps from R to R, then the product $f_1 \times f_2 : R \to R$ defined by $(f_1 \times f_2)(x) = f_1(x) f_2(x)$ need not be one-one.

Watch Video Solution

173. Suppose f_1 and f_2 are non-zero one-one functions from R to R. Is $\frac{f_1}{f_2}$ necessarily one-one? Justify your answer. Here, $\frac{f_1}{f_2} : R \to R$ is given by $\left(\frac{f_1}{f_2}\right)(x) = \frac{f_1(x)}{f_2(x)}$ for all $x \in R$.

Watch Video Solution

174. Given $A = \{2, 3, 4\}$, $B = \{2, 5, 6, 7\}$. Construct an example of an injective map from A to B.

Watch Video Solution

175. Given $A = \{2, \ 3, \ 4\}$, $B = \{2, \ 5, \ 6, \ 7\}$. Construct an example of a mapping from A to B which is not injective

Watch Video Solution

176. Given $A = \{2, \ 3, \ 4\}$, $B = \{2, \ 5, \ 6, \ 7\}$. Construct an example of a mapping from A to B.

Watch Video Solution

177. Show that $f: R \to R$, given by $f(x) = x - [x]$, is neither one-one nor onto.

Watch Video Solution

178. Let $f: N \to N$ be defined by: f(n)={(n+1)/2, if n is odd (n-1)/2, if n is even Show that f is a bijection.

Watch Video Solution

179. Let R be the set of real numbers. If $f: R \rightarrow R: f(x)=x^2$ and $g: R \rightarrow R; g(x)=2x+1$. Then, find fog and gof . Also, show that $fog \neq gof$.

Watch Video Solution

180. Let $: R \rightarrow R$; $f(x)=\sin x$ and $g: R \rightarrow R$; $g(x)=x^2$ find fog and gof .

Watch Video Solution

181. Let $f:\{2,3,4,5\}\overrightarrow{3,4,5,9 andg}:\{3,4,5,9\}\overrightarrow{7,11,15}$ be functions defined at `f(2)=3,f(3)=4,f(4)=f(5)=5,g(3)=g(4)=7,a n dg(5)=g(9)=11.find gof

Watch Video Solution

182. Let $f:\{1,\ 3, 4\}\to\{1,\ 2,\ 5\}$ and $g:\{1,\ 2,\ 5\}\to\{1,\ 3\}$ be given by $f=\{(1,\ 2),\ (3,\ 5),\ (4,\ 1)\}$ and $g=\{(1,\ 3),\ (2,\ 3),\ (5,\ 1)\}$. Write down gof.

Watch Video Solution

183. Find gof and fog , if $f:R\to R$ and $g:R\to R$ are given by $f(x)=|x|$ and $g(x)=|5x-2|$.

Watch Video Solution

184. If the functions f and g are given by $f=\{(1,\ 2),\ (3,\ 5),\ (4,\ 1)\}$ and $g=\{(2,\ 3),\ (5,\ 1),\ (1,\ 3)\}$, find range of f and g . Also, write down fog and gof as sets of ordered pairs.

Watch Video Solution

185. If the function $f: R \rightarrow R$ be given by $f(x) = x^2 + 2$ and $g: R \rightarrow R$ be given by $g(x) = \frac{x}{x-1}$. Find fog and gof.

Watch Video Solution

186. If $f: R - \left\{\frac{7}{5}\right\} \rightarrow R - \left\{\frac{3}{5}\right\}$ be defined as $f(x) = \frac{3x+4}{5x-7}$ and $g: R - \left\{\frac{3}{5}\right\} \rightarrow R - \left\{\frac{7}{5}\right\}$ be defined as $g(x) = \frac{7x+4}{5x-3}$. Show that $gof = I_A$ and $fog = I_B$, where $B = R - \left\{\frac{3}{5}\right\}$ and $A = R - \left\{\frac{7}{5}\right\}$.

Watch Video Solution

187. Find the derivative of $f(x) = x^2 - 3x + 2$.

Watch Video Solution

188. If $f, g: R - R$ are defined respectively by $f(x) = x^2 + 3x + 1, g(x) = 2x - 3,$ find fog (ii) gof (iii) fof (iv) gog.

Watch Video Solution

189. Let $f: Z \rightarrow Z$ be defined by $f(x) = x + 2$. Find $g: Z \rightarrow Z$ such that $gof = I_Z$.

Watch Video Solution

190. If $f: Z \rightarrow Z$ be defined by $f(x) = 2x$ for all $x \in Z$. Find $g: Z \rightarrow Z$ such that $gof = I_Z$.

Watch Video Solution

191. Let f, g and h be functions from R to R . Show that $(f + g)oh = foh + goh$

Watch Video Solution

192. Let f, g and h be functions from R to R . Show that $(fog)oh = (foh)(goh)$

Watch Video Solution

193. Let $f: R \rightarrow R$ be the signum function defined as $f(x) = \{1, \; x > 0, \quad 0, \; x = 0, \quad -1, \; x < 0$ and $g: R \rightarrow R$ be the greatest integer function given by $g(x) = [x]$. Then, prove that fog and gof coincide in $[-1, \; 0)$.

Watch Video Solution

194. Let $A = \{x \in R : 0 \leq x \leq 1\}$. If $f: A\vec{A}$ is defined by $f(x) = \{x, \quad \text{if} \quad x \in Q, 1 - x, \quad \text{if} \quad x \notin Q$ then prove that $fof(x) = x$ for all $x \in A$.

Watch Video Solution

195. Let $f : R\overrightarrow{R}$ and $g : R^{\rightarrow}$ be two functions such that $fog(x) = \sin x^2 and$gof(x)=$\sin^2 x$. Then, find $f(x) and g(x)$.

Watch Video Solution

196. If $f : R \to R$ be given by $f(x) = \sin^2 x + \sin^2(x + \pi/3) + \cos x \cos(x + \pi/3)$ for all $x \in R$, and $g : R \to R$ be such that $g(5/4) = 1$, then prove that $gof : R \to R$ is a constant function.

Watch Video Solution

197. Let $f : Z\overrightarrow{Z}$ be defined by $f(n) = 3n$ for all $n \in Z$ and $g : Z^{\rightarrow}$ be defined by

$f(n) = \left\{ \frac{n}{3}, \quad \text{if} \quad nisa\mu ltipleof30, \quad \text{if} \quad nis\neg\mu ltipleof3f \text{ or } al\ln \in Z. \right.$

Show that $gof = I_Z$ and $fog \neq I_Z$

Watch Video Solution

198. Let $f: R \rightarrow R$ be a function given by $f(x) = ax + b$ for all $x \in R$.

Find the constants a and b such that $fof = I_R$.

Watch Video Solution

199. Let $f: A \rightarrow A$ be a function such that $fof = f$. Show that f is onto if and only if f is one-one. Describe f in this case.

Watch Video Solution

200. Let $f, g: R - R$ be two functions defined as $f(x) = |x| + x$ and $g(x) = |x| - x$, for all x Then find fog and gof.

Watch Video Solution

Watch Video Solution

201. Find gof and fog when $f: R \rightarrow R$ and $g: R \rightarrow R$ is defined by $f(x) = 2x + 3$ and $g(x) = x^2 + 5$

Watch Video Solution

202. Find gof and fog when $f: R \rightarrow R$ and $g: R \rightarrow R$ is defined by $f(x) = 2x + x^2$ and $g(x) = x^3$

Watch Video Solution

203. Find $fog(2)$ and $gof(1)$ when: $f: R \rightarrow R;\ f(x) = x^2 + 8$ and $g: R \rightarrow R;\ g(x) = 3x^3 + 1.$

Watch Video Solution

204. Find gof and fog when $f: R \to R$ and $g: R \to R$ is defined by $f(x) = x$ and $g(x) = |x|$

Watch Video Solution

205. Find gof and fog when $f: R \to R$ and $g: R \to R$ is defined by $f(x) = x^2 + 2x - 3$ and $g(x) = 3x - 4$

Watch Video Solution

206. Find gof and fog when $f: R \to R$ and $g: R \to R$ is defined by $f(x) = 8x^3$ and $g(x) = x^{1/3}$

Watch Video Solution

207. Let $f = \{(3, 1), (9, 3), (12, 4)\}$ and g $= \{(1, 3), (3, 3), (4, 9), (5, 9)\}$ find fog and gof.

Watch Video Solution

208. Let $f = \{(1, -1), (4, -2), (9, -3), (16, 4)\}$ and $g = \{(-1, -2), (-2, -4), (-3, -6), (4, 8)\}$. find gof.

Watch Video Solution

209. Let $A = \{a, b, c\}$, $B = \{u\ v, w\}$ and let f and g be two functions from A to B and from B to A respectively defined as: $f = \{(a, v), (b, u), (c, w)\}$, $g = \{(u, b), (v, a), (w, c)\}$. Show that f and g both are bijections and find fog and gof.

Watch Video Solution

210. Find $fog(2)$ and $gof(1)$ when: $f: R \to R$; $f(x) = x^2 + 8$ and $g: R \to R ; g(x) = 3x^3 + 1$.

Watch Video Solution

211. Let R^+ be the set of all non-negative real numbers. If $f: R^+ \to R^+$ and $g: R^+ \to R^+$ are defined as $f(x) = x^2$ and $g(x) = +\sqrt{x}$. Find fog and gof. Are they equal functions.

Watch Video Solution

212. Let $f: R \to R$ and $g: R \to R$ be defined by $f(x) = x^2$ and $g(x) = x + 1$. Show that $fog \neq gof$.

Watch Video Solution

213. Let $f: R \to R$ and $g: R \to R$ be defined by $f(x) = x + 1$ and $g(x) = x - 1$. Show that $fog = gof = I_R$.

Watch Video Solution

214. Verify assoiativity for the following three mappings : $f: N\overrightarrow{Z}_0$ (the set of non zero integers), $g: Z_0\overrightarrow{Z}$ and $h: Q\overrightarrow{R}$ given by $f(x) = 2x, \; g(x) = \frac{1}{x}$ and $h(x) = e^x$.

Watch Video Solution

215. Consider $f: N \to N, \quad g: N \to N$and $h: N \to R$defined as $f(x) = 2x, \; g(y) = 3y + 4$and $h(z) = s \in z,$ ∀x, y and z in N. Show that ho(gof) = (hog) of.

Watch Video Solution

216. Given examples of two functions $f: \quad N \to N \quad andg: \quad N \to N$ such that of is onto but f is not onto. (Hint: Consider `f(x)" "=" "x+1" "a n d""""""""""g(x)" "=" "{x-1 if x>1 1 if x=1}

Watch Video Solution

217. Give examples of two functions $f: \quad N \rightarrow Z \quad andg: \quad Z \rightarrow Z$ such that o f is injective but is not injective. (Hint: Consider $f(x) \quad = \quad x \quad andg(x) \quad = \quad |x|$)

Watch Video Solution

218. If $f: A \rightarrow B$ and $g: B \rightarrow C$ are one-one functions, show that gof is one-one function.

Watch Video Solution

219. If $f: A \rightarrow B$ and $g: B \rightarrow C$ are onto functions, show that gof is an onto function.

Watch Video Solution

220. If $f: R \rightarrow R$ and $g: R \rightarrow R$ be functions defined by $f(x) = x^2 + 1$ and $g(x) = \sin x$, then find fog and gof .

Watch Video Solution

221. If $f: [0, \infty) \rightarrow R$ and $g: R \rightarrow R$ be defined as $f(x) = \sqrt{x}$ and $g(x) = -x^2 - 1$, then find gof and fog

Watch Video Solution

222. If $f(x) = e^x$ and $g(x) = (\log)_e x (x > 0)$, find fog and gof. Is $fog = gof$?

Watch Video Solution

223. If $f(x) = \sqrt{x} (x > 0)$ and $g(x) = x^2 - 1$ are two real functions, find fog and gof is $fog = gof$?

Watch Video Solution

224. If $f(x) = \frac{1}{x}$ and $g(x) = 0$ are two real functions, show that fog is not defined.

Watch Video Solution

225. Let $f(x) = [x]$ and $g(x) = |x|$. Find $(gof)\left(\frac{5}{3}\right)$ $fog\left(\frac{5}{3}\right)$

Watch Video Solution

226. Let $f(x) = [x]$ and $g(x) = |x|$. Find $(gof)\left(\frac{5}{3}\right)$ $fog\left(\frac{5}{3}\right)$

Watch Video Solution

227. Let $f(x) = [x]$ and $g(x) = |x|$. Find $(f + 2g)(-1)$

Watch Video Solution

228. Let $fandg$ be real functions defined by $f(x) = \frac{x}{x+1} andg(x) = \frac{1}{x+3}$. Describe the functions $gofandfog$ (if they exist).

Watch Video Solution

229. If $f(x) = \frac{3x-2}{2x-3}$, prove that $f(f(x)) = x$ for all $x \in R - \left\{\frac{3}{2}\right\}$.

Watch Video Solution

230. If $f(x) = \frac{1}{2x+1}$, $x \neq -\frac{1}{2}$, then show that $f(f(x)) = \frac{2x+1}{2x+3}$, provided that $x \neq -\frac{3}{2}$.

Watch Video Solution

231. If $f(x) = \frac{x}{\sqrt{1+x^2}}$ then $fofof(x)$

Watch Video Solution

232. Let f be a real function defined by $f(x) = \sqrt{x-1}$. Find $(fofof)(x)\cdot$ Also, show that $fof \neq f^2$.

Watch Video Solution

233. If $f(x) = \frac{x-1}{x+1}, x \neq -1,$ then show that $f(f(x)) = -\frac{1}{x}$ provided that $x \neq 0, 1.$

Watch Video Solution

234. Find fog and gof , if $f(x) = e^x$, $g(x) = (\log)_e x$

Watch Video Solution

235. Find fog and gof, if $f(x) = x^2$, $g(x) = \cos x$

Watch Video Solution

236. Find fog and gof, if $f(x) = |x|$, $g(x) = \sin x$

Watch Video Solution

237. Find fog and gof, if $f(x) = x + 1$, $g(x) = e^x$

Watch Video Solution

238. Find fog and gof, if $f(x) = \sin^{-1} x$, $g(x) = x^2$

Watch Video Solution

239. Find fog and gof, if $f(x) = x + 1$, $g(x) = \sin x$

Watch Video Solution

240. Find fog and gof, if $f(x) = x + 1$, $g(x) = 2x + 3$

Watch Video Solution

241. Find fog and gof, if $f(x) = c,\ c \in R$, $g(x) = \sin x^2$

Watch Video Solution

242. Find fog and gof, if $f(x) = x^2 + 2$, $g(x) = 1 - \frac{1}{1 - x}$

Watch Video Solution

243. Let $f(x) = x^2 + x + 1$ and $g(x) = \sin x$. Show that $fog \neq gof$.

Watch Video Solution

244. $Let f: R \rightarrow R: f(x) = |x|$, Prove that $fof = f$

Watch Video Solution

245. If $f(x) = 2x + 5$ and $g(x) = x^2 + 1$ be two real functions, then describe f^2. Also, show that $fof \neq f^2$.

Watch Video Solution

246. If $f(x) = 2x + 5$ and $g(x) = x^2 + 1$ be two real functions, then describe f^2. Also, show that $fof \neq f^2$.

Watch Video Solution

247. If $f(x) = 2x + 5$ and $g(x) = x^2 + 1$ be two real functions, then describe f^2. Also, show that $fof \neq f^2$.

Watch Video Solution

248. If $f(x) = 2x + 5$ and $g(x) = x^2 + 1$ be two real functions, then describe f^2. Also, show that $fof \neq f^2$.

Watch Video Solution

249. If $f(x) = \sin x$ and $g(x) = 2x$ be two real functions, then describe gof and fog. Are these equal functions?

Watch Video Solution

250. Let f, g, h be real functions given by $f(x) = \sin x$, $g(x) = 2x$ and $h(x) = \cos x$. Prove that $fog = go(fh)$.

Watch Video Solution

251. Let f be any real function and let g be a function given by $g(x) = 2x$. Prove that $gof = f + f$.

Watch Video Solution

252. If $f(x) = \sqrt{1 - x}$ and $g(x) = (\log)_e x$ are two real functions, then describe functions fog and gof .

Watch Video Solution

253. If $f: (-\pi/2, \pi/2) \rightarrow R$ and $g: [-1, 1] \rightarrow R$ be defined as $f(x) = \tan x$ and $g(x) = \sqrt{1 - x^2}$ respectively. Describe fog and gof .

Watch Video Solution

254. If $f(x) = \sqrt{x+3}$ and $g(x) = x^2 + 1$ be two real functions, then find fog and gof .

Watch Video Solution

255. Let f be a real function given by $f(x) = \sqrt{x-2}$. Find fof. Also, show that $fof \neq f^2$

Watch Video Solution

256. Let $f(x) = 1 + x$, $0 \leq x \leq 2$ and $f(x) = 3 - x$,$2 < x \leq 3$. Find $f(f(x))$.

Watch Video Solution

257. If $f, g, : R - R$ be two functions defined as $f(x) = |x| + x$ and $g(x) = |x| - x$, $\forall x R$, Then find fog and gof. Hence find

$fog(-3), fog(5)$ and $gof(-2)$.

Watch Video Solution

258. If $f: Q \rightarrow Q$ is given by $f(x) = x^2$, then find $f^{-1}(9)$

Watch Video Solution

259. If $f: Q \rightarrow Q$ is given by $f(x) = x^2$, then find $f^{-1}(5)$

Watch Video Solution

260. If $f: Q \rightarrow Q$ is given by $f(x) = x^2$, then find $f^{-1}(0)$

Watch Video Solution

261. If the function $f: R \rightarrow R$ be defined by $f(x) = x^2 + 5x + 9$, find $f^{-1}(8)$ and $f^{-1}(9)$.

Watch Video Solution

262. If the function $f: C \rightarrow C$ be defined by $f(x) = x^2 - 1$, find $f^{-1}(-5)$ and $f^{-1}(8)$.

Watch Video Solution

263. Let $f: R \rightarrow R$ be defined as $f(x) = x^2 + 1$. Find: $f^{-1}(10)$

Watch Video Solution

264. If $A = \{1, 2, 3, 4\}$, $B = \{2, 4, 6, 8\}$ and $f: A \rightarrow B$ is given by $f(x) = 2x$, then write f and f^{-1} as a set of ordered pairs.

Watch Video Solution

265. Let $S = \{1, 2, 3\}$. Determine whether the functions $f : S \rightarrow S$ defined as below have inverses. Find f^{-1}, if it exists.(a) $f = \{(1, 1), (2, 2), (3, 3)\}$(b) `f = {(1, 2), (2, 1), (3, 1)}

Watch Video Solution

266. Consider $f : \{1, 2, 3\} \rightarrow \{a, b, c\}$given by $f(1) = a$, $f(2) = b$and $f(3) = c$. Find $f^{-1}$and show that $\left(f^{-1}\right)^{-1} = f$.

Watch Video Solution

267. If $f : R - R$ is defined by $f(x) = 2x + 7$. Prove that f is a bijection. Also, find the inverse of f.

Watch Video Solution

268. Let $f: R \to R$ be a function given by $f(x) = x^2 + 1$. Find: $f^{-1}\{26\}$

Watch Video Solution

269. Let $f: R \to R$ be defined by $f(x) = 3x - 7$. Show that f is invertible and hence find f^{-1} .

Watch Video Solution

270. Show that $f: R - [0] \to R - [0]$ given by $f(x) = \frac{3}{x}$ is invertible and it is inverse of itself.

Watch Video Solution

271. Let $f: N \cup \{0\} \to N \cup \{0\}$ be defined by $f(n) = \{n + 1, \quad \text{if} \quad n\,is\,even, \quad n - 1, \quad \text{if} \quad n\,is\,odd$ Show that f is invertible and $f = f^{-1}$.

Watch Video Solution

272. Prove that the function $f: R \rightarrow R$ defined as $f(x) = 2x - 3$ is invertible. Also, find f^{-1}.

Watch Video Solution

273. Show that the function $f: R \rightarrow R$ is given by $f(x) = 1 + x^2$ is not invertible.

Watch Video Solution

274. Show that $f: R - \{-1\} \rightarrow R - \{1\}$ given by $f(x) = \dfrac{x}{x+1}$ is invertible. Also, find f^{-1}.

Watch Video Solution

275. Show that $f:[-1, 1] \rightarrow R$, given by $f(x) = \dfrac{x}{(x+2)}$ is one- one .

Find the inverse of the function $f:[-1, 1]$

Watch Video Solution

276. Let $f: R^{\rightarrow}$ be defined as $f(x) = 10x + 7$. Find the function

$g: R\overrightarrow{R}$ such that $gof = fog = I_R$.

Watch Video Solution

277. If the function $f:[1, \infty) \rightarrow [1, \infty)$ is defined by $f(x) = 2^{x(x-1)}$,

then $f^{-1}(x)$ is (A) $\left(\frac{1}{2}\right)^{x(x-1)}$ (B) $\frac{1}{2}\sqrt{1+4\log_2 x}$ (C) $\frac{1}{2}\left(1-\sqrt{1+4\log_2 x}\right)$ (D) not defined

Watch Video Solution

278. The value of parameter α, for which the function $f(x) = 1 + \alpha x, \alpha \neq 0$ is the inverse of itself

Watch Video Solution

279. Let $f: N\overrightarrow{Y}$ 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 (1) $g(y) = \dfrac{3y+4}{3}$ (2) $g(y) = 4 + \dfrac{y+3}{4}$ (3) $g(y) = \dfrac{y+3}{4}$ (4) $g(y) = \dfrac{y-3}{4}$

Watch Video Solution

280. Let $Y = \{n^2 : n \in N\} \in N$. Consider $f: N \rightarrow Y$ as $f(n) = n^2$. Show that f is invertible. Find the inverse of f.

Watch Video Solution

281. Let $f: N \rightarrow R$be a function defined as $f(x) = 4x^2 + 12x + 15.$ Show that $f: N \rightarrow S$, where, S is the range of f, is invertible. Find the inverse of f.

Watch Video Solution

282. State with reason whether following functions have inverse (i) $f: \{1, 2, 3, 4\} \rightarrow \{10\} with f = \{(1, 10), (2, 10), (3, 10), (4, 10)\}$(ii) `g: {5, 6, 7, 8}->{1,2,3,4} w i t h g={(5, 4),(6, 3),(7, 4),(8, 2)}

Watch Video Solution

283. State with reason whether following functions have inverse (i) $f: \{1, 2, 3, 4\} - \{10\} with f = \{(1, 10), (2, 10), (3, 10), (4, 10)\}$(ii) `g: {5, 6, 7, 8}-{1,2,3,4} w i t h g={(5, 4),(6, 3),(7, 4),(8, 2)}

Watch Video Solution

284. State with reasons whether $h: \{2, 3, 4, 5\} \to \{7, 9, 11, 13\}$ with $h = \{(2, 7), (3, 9), (4, 11), (5, 13)\}$have inverse or not

Watch Video Solution

285. Find f^{-1} if it exists: $f: A \to B$ where $A = \{0, -1, -3, 2\}$; $B = \{-9, -3, 0, 6\}$ and $f(x) = 3x$.

Watch Video Solution

286. Find f^{-1} if it exists: $f: A \to B$ where $A = \{1, 3, 5, 7, 9\}$; $B = \{0, 1, 9, 25, 49, 81\}$ and $f(x) = x^2$.

Watch Video Solution

287. Consider $f: \{1, 2, 3\} \to \{a, b, c\}$ and $g: \{a, b, c\} \to$ {apple, ball, cat} defined as $f(1) = a$, $f(2) = b$, $f(3) = c$, $g(a) =$ apple,

$g(b) =$ ball and $g(c) =$ cat. Show that $f,\ g\,and\,gof$ are invertible. Find $f^{-1},\ g^{-1}$ and $(gof)^{-1}$ and show that $(gof)^{-1} = f^{-1}o\,g^{-1}$.

Watch Video Solution

288. Let $A = \{1, 2, 3, 4\};\ B = \{3, 5, 7, 9\}; C = \{7, 23, 47, 79\}$ and $f: A \to B$, $g: B \to C$ be defined as $f(x) = 2x + 1$ and $g(x) = x^2 - 2$. Express $(gof)^{-1}$ and $f^{-1}o\,g^{-1}$ as the sets of ordered pairs and verify that $(gof)^{-1} = f^{-1}og^{-1}$.

Watch Video Solution

289. Show that the function $f: Q \to Q$ defined by $f(x) = 3x + 5$ is invertible. Also, find f^{-1} .

Watch Video Solution

290. Consider $f: R \rightarrow R$given by $f(x) = 4x + 3$. Show that f is invertible. Find the inverse of f.

Watch Video Solution

291. Consider $f: R_+ \overrightarrow{4, \infty}$ given by $f(x) = x^2 + 4$. Show that f is invertible with the inverse f^{-1} of f given by $f^{-1}(y) = \sqrt{y - 4}$, where R_+ is the set of all non-negative real numbers.

Watch Video Solution

292. If $f(x) = \frac{4x+3}{6x-4}$, $x \neq \frac{2}{3}$, show that $fof(x) = x$ for all $x \neq \frac{2}{3}$. What is the inverse of f?

Watch Video Solution

293. Consider $f: R_{\pm} > [-5, \infty)$given by $f(x) = 9x^2 + 6x - 5$. Show that f is invertible with $f^{-1}(y) = \left(\frac{\left(\sqrt{y+6}\right) - 1}{3}\right)$

Watch Video Solution

294. If $f: R \rightarrow R$ be defined by $f(x) = x^3 - 3$, then prove that f^{-1} exists and find a formula for f^{-1} . Hence, find $f^{-1}(24)$ and $f^{-1}(5)$.

Watch Video Solution

295. A function $f: R \rightarrow R$ is defined as $f(x) = x^3 + 4$. Is it a bijection or not? In case it is a bijection, find $f^{-1}(3)$.

Watch Video Solution

296. If $f: Q \to Q, \quad g: Q \to Q$ are two functions defined by $f(x) = 2x$ and $g(x) = x + 2$, show that f and g are bijective maps. Verify that $(gof)^{-1} = f^{-1} og^{-1}$.

Watch Video Solution

297. Let $A = R - \{3\} and B = R - \{1\}$. Consider the function $f: A^{\to}$ defined by $f(x) = \frac{x-2}{x-3}$. Show that is one-one and onto and hence find f^{-1}

Watch Video Solution

298. Consider $f: R_{\pm} > [-9, \infty[$ given by $f(x) = 5x^2 + 6x - 9$. Prove that f is invertible with $f^{-1}(y) = \frac{\sqrt{54+5y}-3}{5}$

Watch Video Solution

299. Let $f: N \overrightarrow{\quad}$ be a function defined as $f(x) = 9x^2 + 6x - 5$. Show that $f: N\overrightarrow{S}$, where S is the range of f, is invertible. Find the inverse of f and hence $f^{-1}(43)$ and $f^{-1}(163)$.

Watch Video Solution

300. If $f: R\overrightarrow{-1, 1}$ defined by $f(x) = \dfrac{10^x - 10^{-x}}{10^x + 10^{-x}}$ is invertible, find f^{-1}

Watch Video Solution

301. If $f: R \to (0, 2)$ defined by $f(x) = \dfrac{e^x - e^{-x}}{e^x + e^{-x}} + 1$ is invertible, find f^{-1}.

Watch Video Solution

302. Let $f: [-1, \infty]\overrightarrow{-1,}$ is given by $f(x) = (x+1)^2 - 1, x \geq -1$. Show that f is invertible. Also, find the set $S = \{x : f(x) = f^{-1}(x)\}$.

Watch Video Solution

303. Let $A = \{x \in R \mid -1 \leq x \leq 1\}$ and let $f: A \to A,\ g: A \to A$ be two functions defined by $f(x) = x^2$ and $g(x) = \frac{\sin(\pi x)}{2}$. Show that g^{-1} exists but f^{-1} does not exist. Also, find g^{-1}.

Watch Video Solution

304. Let f be a function from R to R such that $f(x) = \cos(x+2)$. Is f invertible? Justify your answer.

Watch Video Solution

305. If $A = \{1,\ 2,\ 3,\ 4\}$ and $B = \{a,\ b,\ c,\ d\}$. Define any four bijectives from A to B. Also, give their inverse functions.

Watch Video Solution

306. Let A and B be two sets each with a finite number of elements. Assume that there is an injective mapping from A to Band that there is an injective mapping from B to A Prove that there is a bijective mapping from A to B.

Watch Video Solution

307. If $f : A\overrightarrow{A}, g : A^{\rightarrow}$ are two bijections, then prove that fog is an injection (ii) fog is a surjection.

Watch Video Solution

308. If $f : A \rightarrow A, \quad g : A \rightarrow A$ are two bijections, then prove that fog is an surjection.

Watch Video Solution

309. Which one of the following graphs represent a function? (FIGURE)

Watch Video Solution

310. Which one of the following graphs represent a one-one function? (FIGURE)

Watch Video Solution

311. Let $A = \{1,\ 2\}$ and $B = \{a,\ b\}$ be two sets. Write total number of one-one functions from A to B .

Watch Video Solution

312. Write total number of one-one functions from set $A = \{1,\ 2,\ 3,\ 4\}$ to set $B = \{a,\ b,\ c\}$.

Watch Video Solution

313. If $f: R \to R$ is defined by $f(x) = x^2$, write $f^{-1}(25)$.

Watch Video Solution

314. If $f: C \to C$ is defined by $f(x) = x^2$, write $f^{-1}(-4)$. Here, C denotes the set of all complex numbers.

Watch Video Solution

315. If $f: R \to R$ is given by $f(x) = x^3$, write $f^{-1}(1)$.

Watch Video Solution

316. Let C denote the set of all complex numbers. A function $f: C \to C$ is defined by $f(x) = x^3$. Write $f^{-1}(1)$.

Watch Video Solution

317. Let f be a function from C (set of all complex numbers) to itself given by $f(x) = x^3$. Write $f^{-1}(1)$.

Watch Video Solution

318. Let $f: R \rightarrow R$ be defined by $f(x) = x^4$, write $f^{-1}(1)$.

Watch Video Solution

319. Find the derivative of $f(x) = x^4$

Watch Video Solution

320. If $f: R \rightarrow R$ is defined by $f(x) = x^2$, write $f^{-1}(25)$.

Watch Video Solution

321. If $f: C \rightarrow C$ is defined by $f(x) = (x - 2)^3$, write $f^{-1}(-1)$.

Watch Video Solution

322. If $f: R \rightarrow R$ is defined by $f(x) = 10x - 7$, then write $f^{-1}(x)$.

Watch Video Solution

323. Let $f: \left\{-\frac{\pi}{2}, \frac{\pi}{2}\right\} \rightarrow R$ be a function defined by $f(x) = \cos[x]$. Write range (f).

Watch Video Solution

324. If $f: R \rightarrow R$ defined by $f(x) = 3x - 4$ is invertible then write $f^{-1}(x)$.

Watch Video Solution

325. If $f: R \rightarrow R$, $g: R \rightarrow R$ are given by $f(x) = (x+1)^2$ and $g(x) = x^2 + 1$, then write the value of $fog(-3)$.

Watch Video Solution

326. Let $A = \{x \in R: -4 \leq x \leq 4 \text{ and } x \neq 0\}$ and $f: A \rightarrow R$ be defined by $f(x) = \frac{|x|}{x}$. Write the range of f.

Watch Video Solution

327. Let $f: \left[-\frac{\pi}{2}, \frac{\pi}{2}\right] \rightarrow A$ be defined by $f(x) = \sin x$. If f is a bijection, write set A .

Watch Video Solution

328. Let $f: R \rightarrow R^{+}$ be defined by $f(x) = a^{x},\ a > 0$ and $a \neq 1$. Write $f^{-1}(x)$.

Watch Video Solution

329. Let $f: R - \{-1\} \rightarrow R - \{1\}$ be given by $f(x) = \dfrac{x}{x+1}$. Write $f^{-1}(x)$.

Watch Video Solution

330. Let $f: R - \left\{-\dfrac{3}{5}\right\} \rightarrow R$ be a function defined as $f(x) = \dfrac{2x}{5x+3}$. Write f^{-1} : Range of $f \rightarrow R - \left\{-\dfrac{3}{5}\right\}$.

Watch Video Solution

331. Let $f: R \rightarrow R$, $g: R \rightarrow R$ be two functions defined by $f(x) = x^{2} + x + 1$ and $g(x) = 1 - x^{2}$. Write $fog(-2)$.

Watch Video Solution

332. Let $f : R \to R$ be defined as $f(x) = \frac{2x-3}{4}$. Write $fof^{-1}(1)$.

Watch Video Solution

333. Let f be an invertible real function. Write $(f^{-1}of)(1) + (f^{-1}of)(2) + + (f^{-1}of)(100)$.

Watch Video Solution

334. Let $A = \{1, 2, 3, 4\}$ and $B = \{a, b\}$ be two sets. Write total number of onto functions from A to B.

Watch Video Solution

335. Write the domain of the real function $f(x) = \sqrt{x - [x]}$.

Watch Video Solution

336. Write the domain and range of function $f(x)$ given by $f(x) = \sqrt{[x] - x}$.

Watch Video Solution

337. Write the domain of the real function $f(x) = \frac{1}{\sqrt{|x| - x}}$

Watch Video Solution

338. Write whether $f: R \rightarrow R$ given by $f(x) = x + \sqrt{x^2}$ is one-one, many-one, onto or into.

Watch Video Solution

339. If $\mathrm{f(x)} = x + 7$ and $g(x) = x - 7,\ x\ \ R,$ find $(fog)(7)$

Watch Video Solution

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

Watch Video Solution

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

Watch Video Solution

342. If $f: R \rightarrow R$ is defined by $f(x) = 3x + 2$, find $f(f(x))$.

Watch Video Solution

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

Watch Video Solution

344. If $f: \{5,\ 6\} \rightarrow \{2,\ 3\}$ and $g: \{2,\ 3\} \rightarrow \{5,\ 6\}$ are given by $f = \{(5,\ 2),\ (6,\ 3)\}$ and $g = \{(2,\ 5),\ (3,\ 6)\}$, find fog.

Watch Video Solution

345. Let $f: R \rightarrow R$ be the function defined by $f(x) = 4x - 3$ for all $x \in R$. Then write f^{-1}.

Watch Video Solution

346. Which one the following relations on $A = \{1,\ 2,\ 3\}$ is a function?

$f = \{(1,\ 3),\ (2,\ 3),\ (3,\ 2)\},\ \ g = \{(1,\ 2),\ (1,\ 3),\ (3,\ 1)\}$

Watch Video Solution

347. Write the domain of the real function f defined by $f(x) = \sqrt{25 - x^2}$.

Watch Video Solution

348. Let $A = \{a, b, c, d\} and f : A \overrightarrow{A}$ be given by $f = \{(a, b), (b, d), (c, a), (d, c)\}$, write f^{-1}.

Watch Video Solution

349. Let $f, g : R^{\rightarrow}$ be defined by $f(x) = 2x + 1 and g(x) = x^2 - 2$ for all $x \in R$, respectively. Then, find gof.

Watch Video Solution

350. If the mapping $f:\{1,\ 3,\ 4\} \to \{1,\ 2,\ 5\}$ and $g:\{1,\ 2,\ 5\} \to \{1,\ 3\}$, given by $f = \{(1,\ 2),\ (3,\ 5),\ (4,\ 1)\}$ and $g = \{(2,\ 3),\ (5,\ 1),\ (1,\ 3)\}$, write fog.

Watch Video Solution

351. If a function $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is described by $g(x) = \alpha x + \beta,$ find the values of $\alpha and \beta$.

Watch Video Solution

352. If $f(x) = -4 - (x-7)^3$, write $f^{-1}(x)$.

Watch Video Solution

353. Let $A = \{x \in R: -1 \leq x \leq 1\} = B$ and $C = \{x \in R: x \geq 0\}$ and let $S = \{(x, y) \in A \times B: x^2 + y^2 = 1\}$ and $S_0 = \{(x, y) \in A \times C: x^2 + y^2 = 1\}$. Then S defines a function from A to B (b) S_0 defines a function from A to C (c) S_0 defines a function from A to B (d) S defines a function from A to C

Watch Video Solution

354. $f: R \rightarrow R$ given by $f(x) = x + \sqrt{x^2}$ is (a) injective (b) surjective (c) bijective (d) none of these

Watch Video Solution

355. If $f: A \rightarrow B$ given by $3^{f(x)} + 2^{-x} = 4$ is a bijection, then A

Watch Video Solution

356. The function $f: R \rightarrow R$ defined by $f(x) = 2^x + 2^{|x|}$ is (a) one-one and onto (b) many-one and onto (c) one-one and into (d) many-one and into

Watch Video Solution

357. Let the function $f: R - \{-b\} \rightarrow R - \{1\}$ be defined by $f(x) = \dfrac{x+a}{x+b}, a \neq b$, 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) none of these

Watch Video Solution

358. The function $f: A \rightarrow B$ defined by $f(x) = -x^2 + 6x - 8$ is a bijection, if $A = (-\infty, 3]$ and $B = (-\infty, 1]$ (b) $A = [-3, \infty)$ and $B = (-\infty, 1]$ (c) $A = (-\infty, 3]$ and $B = [1, \infty)$ (d) $A = [3, \infty)$ and $B = [1, \infty)$

Watch Video Solution

359. Let $A = \{x \in R : -1 \leq x \leq 1\} = B$. Then, the mapping $f: A \to B$ given by $f(x) = x|x|$ is (a) injective but not surjective (b) surjective but not injective (c) bijective (d) none of these

Watch Video Solution

360. Let $f: R \to R$ be given by $f(x) = [x]^2 + [x+1] - 3$, where $[x]$ denotes the greatest integer less than or equal to x . Then, $f(x)$ is (a) many-one and onto (b) many-one and into (c) one-one and into (d) one-one and onto

Watch Video Solution

361. Let M be the set of all 2×2 matrices with entries from the set R of real numbers. Then the function $f: M \to R$ defined by $f(A) = |A|$

for every $A \in M$, is (a) one-one and onto (b) neither one-one nor onto (c) one-one but not onto (d) onto but not one-one

Watch Video Solution

362. The function $f: [0, \infty) \to R$ given by $f(x) = \frac{x}{x+1}$ is (a) one-one and onto (b) one-one but not onto (c) onto but not one-one (d) neither one-one nor onto

Watch Video Solution

363. The range of the function $f(x) = {}^{7-x}P_{x-3}$ is (a) {1, 2, 3, 4, 5} (b) {1, 2, 3, 4, 5, 6} (c) {1, 2, 3, 4} (d) {1, 2, 3}

Watch Video Solution

364. A function f from the set of natural numbers to integers is defined by n when n is odd f(n) =3, when n is even Then f is (b) one-one but not onto a) neither one-one nor onto (c) onto but not one-one (d) one-one and onto both

Watch Video Solution

365. Let f be an injective map. with domain (x, y, z and range (1, 2, 3), such that exactly one following statements is correct and the remaining are false : $f(x) = 1, f(y) \neq 1, f(z) \neq 2$ The value of $f^{-1}(1)$ is

Watch Video Solution

366. Which of the following function from Z to itself are bijections? $f(x) = x^3$ (b) $f(x) = x + 2$ $f(x) = 2x + 1$ (d) $f(x) = x^2 + x$

Watch Video Solution

367. Let $A = [-1, 1]$. Then, discuss whether the following functions from A to itself are one-one onto or bijective: $f(x) = \frac{x}{2}$ (ii) $g(x) = |x|$

(iii) $h(x) = x^2$

Watch Video Solution

368. Let $A\{x: -1 \leq x \leq 1\} and f: \overrightarrow{A}$ such that $f(x) = x|x|,$ then f is (a) bijection (b) injective but not surjective (c)Surjective but not injective (d) neither injective nor surjective

Watch Video Solution

369. If the function $f: R\overrightarrow{A}$ given by $f(x) = \dfrac{x^2}{x^2+1}$ is surjection, then find $A\cdot$

Watch Video Solution

370. If a function $f: [2, \infty) \rightarrow R$ defined by $f(x) = (x-1)(x-2)(x-3)$ is (a) one-one but not onto (b) onto but not one-one (c) both one and onto (d) neither one-one nor onto

Watch Video Solution

371. The function $f:[-1/2, 1/2] \to [-\pi/2, \pi/2]$ defined by $f(x) = \sin^{-1}(3x - 4x^3)$ is (a) bijection (b) injection but not a surjection (c) surjection but not an injection (d) neither an injection nor a surjection

Watch Video Solution

372. Let $f: R \to R$ be a function defined by $f(x) = \frac{e^{|x|} - e^{-x}}{e^x + e^{-x}}$ then -- (1) f is bijection (2) f is an injection only (3) f is a surjection (4) f is neither injection nor a surjection

Watch Video Solution

373. Let $f: R - \{n\} \to R$ be a function defined by $f(x) = \frac{x - m}{x - n}$ such that $m \neq n$ 1) f is one one into function2) f is one one onto function3) f is many one into funciton4) f is many one onto function then

Watch Video Solution

374. Let $f: R \rightarrow R$ be a function defined by $f(x)=\frac{x^{2}-8}{x^{2}+2}$. Then, f is (a) one-one but not onto (b) one-one and onto (c) onto but not one-one (d) neither one-one nor onto

Watch Video Solution

375. $f: R \rightarrow R$ is defined by $f(x)=\frac{e^{x} \hat{} 2-e^{-x} \hat{} 2}{e^{x} \hat{} 2+e^{-x} \hat{} 2}$ is (a) one-one but not onto (b) many-one but onto (c) one-one and onto (d) neither one-one nor onto

Watch Video Solution

376. The function $f: R \to R$, $f(x) = x^2$ is (a) injective but not surjective (b) surjective but not injective (c) injective as well as surjective (d) neither injective nor surjective

Watch Video Solution

377. A function f from the set of natural numbers to integers defined by $f(n) = \begin{cases} \frac{n-1}{2}, \ when\ n\ is\ odd - \frac{n}{2}, \ when\ n\ is\ even \end{cases}$ is (a) neither one-one nor onto (b) one-one but not onto (c) onto but not one-one (d) one-one and onto both

Watch Video Solution

378. Which of the following functions from $A = \{x \in R : -1 \leq x \leq 1\}$ to itself are bijections? $f(x) = |x|$ (b) $f(x) = \sin\left(\frac{\pi x}{2}\right)$ (c) $f(x) = \sin\left(\frac{\pi x}{4}\right)$ (d) none of these

Watch Video Solution

379. Let $f: Z \rightarrow Z$ be given by $f(x)=\left\{\frac{x}{2}, \quad \text{if} \quad x \, is \, even, 0, \quad \text{if} \quad x \, is \, odd\right.$. Then, f is (a) onto but not one-one (b) one-one but not onto (c) one-one and onto (d) neither one-one nor onto

Watch Video Solution

380. The function $f: R \rightarrow R$ defined by $f(x)=6^x+6^{|x|}$ is (a) one-one and onto (b) many one and onto (c) one-one and into (d) many one and into

Watch Video Solution

381. Let $f(x)=x^2$ and $g(x)=2^x$. Then the solution set of the equation $fog(x)=gof(x)$ is $(a) R$ (b) {0} (c) {0, 2} (d) none of these

Watch Video Solution

382. If $f(x) = 3x - 5$, then $f^{-1}(x)$ (a) is given by $\frac{1}{(3x-5)}$ (b) is given by $\frac{(x+5)}{3}$ (c) does not exist because f is not one-one (d) does not exist because f is not onto

Watch Video Solution

383. If $g(f(x)) = |\sin x| and f(g(x)) = (\sin\sqrt{x})^2$, then

$(a).\ f(x) = \sin^2 x, g(x) = \sqrt{x}$ $(b).\ f(x) = \sin x, g(x) = |x|$

$(c) f\left(x = x^2, g(x) = \sin\sqrt{x}\right.$ $(d).\ f\ and g$ cannot be determined

Watch Video Solution

384. The inverse of the function $f: \overrightarrow{Rx \in R : x < 1}$ given by $f(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$, is $\frac{1}{2}\frac{\log(1+x)}{1-x}$ (b) $\frac{1}{2}\frac{\log(2+x)}{2-x}$ $\frac{1}{2}\frac{\log(1-x)}{1+x}$

(d) None of these

Watch Video Solution

385. If the function $f:(1, \infty)^{\rightarrow}(1, \infty)$ is defined by $f(x)=2^{x(x-1)}, then f^{-1}(x)$ is $\left(\frac{1}{2}\right)^{x(x-1)}$ (b) $\frac{1}{2}\left(1+\sqrt{1+4(\log)_2 x}\right)$ $\frac{1}{2}\left(1-\sqrt{1+(\log)_2 x}\right.$ (d) not defined

Watch Video Solution

386. Let $A=\{x \in R: x \leq 1\}$ and $f: A \rightarrow A$ be defined as $f(x)=x(2-x)$. Then, $f^{-1}(x)$ is: (a)$1+\sqrt{1-x}$ (b) $1-\sqrt{1-x}$ (c) $\sqrt{1-x}$ (d) $1 \pm \sqrt{1-x}$

Watch Video Solution

387. Let $f(x)=\frac{1}{1-x}$. Then, $\{f\,o\,(f\,o\,f)\}(x)=(a) x$ for all $x \in R$ (b) x for all $x \in R-\{1\}$ (c) x for all $x \in R-\{0,\ 1\}$ (d) none of these

Watch Video Solution

388. If the function $f: R \rightarrow R$ be such that $f(x) = x - [x]$, where $[x]$ denotes the greatest integer less than or equal to x, then $f^{-1}(x)$ is

Watch Video Solution

389. If $F: [1, \infty)\overrightarrow{2, \infty}$ is given by $f(x) = x + \frac{1}{x}, thenf^{-1}(x)$ equals. $\frac{x + \sqrt{x^2 - 4}}{2}$ (b) $\frac{x}{1 + x^2}$ (c) $\frac{x - \sqrt{x^2 - 4}}{2}$ $1 + \sqrt{x^2 - 4}$

Watch Video Solution

390. Let $g(x) = 1 + x - [x] and f(x) = \{ -1, x < 0; 0, \quad \text{if} \quad x = 0; 1, \quad \text{if} \quad x > 0$. Then for all x, $f(g(x))$ is equal to (where [.] represents the greatest integer function). (a) x (b) 1 (c) $f(x)$ (d) $g(x)$

Watch Video Solution

391. Let $f(x)=\frac{\alpha x}{(x+1)}, x \neq -1$. for what value of α is $f(f(x))=x$? (a) $\sqrt{2}$ (b) $-\sqrt{2}$ (c) 1 (d) -1

Watch Video Solution

392. The distinct linear functions which map [-1, 1] onto [0, 2] are $f(x)=x+1, \ g(x)=-x+1$ (b) $f(x)=x-1, \ g(x)=x+1$ (c) $f(x)=-x-1, \ g(x)=x-1$ (d) none of these

Watch Video Solution

393. If $f:[2,\infty) \rightarrow (-\infty, 4]$, where $f(x)=x(4-x)$ then find $f^{-1}(x)$

Watch Video Solution

394. If $f: R \overrightarrow{-1, 1}$ is defined by $f(x) = -\frac{x|x|}{1+x^2}, thenf^{-1}(x)$ equals $\sqrt{\frac{|x|}{1-|x|}}$ (b) $-sgn(x)\sqrt{\frac{|x|}{1-|x|}}$ $-\sqrt{\frac{x}{1-x}}$ (d) none of these

Watch Video Solution

395. Let $[x]$ denote the greatest integer less than or equal to x . If $f(x) = \sin^{-1} x,\ \ g(x) = [x^2]$ and $h(x) = 2x,\ \ \frac{1}{2} \leq x \leq \frac{1}{\sqrt{2}}$, then $fogoh\ (x)\ = \pi/2$ (b) $fogoh\ (x) = \pi$ (c) $hofog = hogof$ (d) $hofog\ \neq hogof$

Watch Video Solution

396. If $g(x) = x^2 + x - 2and\frac{1}{2}gof(x) = 2x^2 - 5x + 2,$ then which is not a possible $f(x)$? (a)$2x - 3$ (b) $-2x + 2$ (c)$x - 3$ (d) None of these

Watch Video Solution

397. If $f(x) = \sin^2 x$ and the composite function $g(f(x)) = |\sin x|$, then $g(x)$ is equal to (a) $\sqrt{x-1}$ (b) $\sqrt{x}$ (c) $\sqrt{x+1}$ (d) $-\sqrt{x}$

Watch Video Solution

398. Let $f: R \rightarrow R$ be given by $f(x) = x^2 - 3$. Then, f^{-1} is given by $\sqrt{x+3}$ (b) $\sqrt{x} + 3$ (c) $x + \sqrt{3}$ (d) none of these

Watch Video Solution

399. Let $f(x) = x^3$ be a function with domain {0, 1, 2, 3}. Then domain of f^{-1} is (a) {3, 2, 1, 0} (b) {0, -1, -2, -3} (c) {0, 1, 8, 27} (d) {0, -1, -8, -27}

Watch Video Solution

400. Let $f: R \rightarrow R$ be given by $f(x) = x^2 - 3$. Then, f^{-1} is given by $(a)\sqrt{x+3}$ (b) $\sqrt{x} + 3$ (c) $x + \sqrt{3}$ (d) none of these

Watch Video Solution

401. Let $f: R \to R$ be given by $f(x) = \tan x$. Then, $f^{-1}(1)$ is $\frac{\pi}{4}$ (b) $\left\{n\pi + \frac{\pi}{4} : n \in Z\right\}$ (c) does not exist (d) none of these

Watch Video Solution

402. Let $f: R \to R$ be defined as f(x)={ 2x, if x>3, x^2 if x is less than 1. FInd value of f(-1)+f(4)

Watch Video Solution

403. Let $A = \{1, 2, \dots, n\}$ and $B = \{a, b\}$. Then number of subjections from A into B is$n_P - 2$(b) $2^n - 2$ (c) $2^n - 1$ (d) nC2

Watch Video Solution

404. If the set A contains 5 elements and the set B contains 6 elements, then the number of one-one and onto mappings from A to B is (a) 720 (b) 120 (c) 0 (d) none of these

Watch Video Solution

405. If the set A contains 7 elements and the set B contains 10 elements, then the number of one-one functions from A to B is (a) 10C7 (b) 10C7 x 7! (c) 7^{10} (d) 10^{7}

Watch Video Solution

406. Let $f: R - \left\{\frac{3}{5}\right\} \to R$ be defined by $f(x) = \frac{3x+2}{5x-3}$. Then (a).f^-1(x)=f(x). (b).f-1(x)= -f(x). (c). (fof)=x (d). f-1(x)=(1/19)f(x)

Watch Video Solution