MATHS

BOOKS - MBD MATHS (ODIA ENGLISH)

RELATIONS AND FUNCTIONS

Question Bank

1. Compute the product $A \times B$ when A = {0} = B

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2. Compute the product $A \times B$ A = {a,b} , B = {a,b,c}

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3. Compute the product A = Z, B = ϕ

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4. If $|A|$ = m , $|B|$ = n ,what can you say about $|A \times B|$

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5. If $|A|$ = m , $|B|$ = n ,what can you say about $|P(A)XP(B)|$

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6. Find x,y if (x,y) = (-3,2)

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7. Find x,y if (x+y`1) = (1, x-y)

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8. Find x,y if (2x+y,1) = (x,2x+3y)

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9. If $A \times B = B \times A$ then what can you say about A and B ?

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10. $|A \times B|$ = 6. If (-1,y), (1,x),(0,y) are in $A \times B$. Write other elements in $A \times B$, where $x \neq y$.

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11. Let A = { a,b,c }, $|B|$ = {1,2} Determine all the relations from A to B and determine the domain range and inverse of each relation.

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12. Let A = { a,b,c }, $|B|$ = {1,2} Determine all the relation from B to A .

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13. Let A = { a,b,c }, $|B|$ = {1,2} Is there any relation which is both a relation from A to B and B to A ? How many ?

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14. Let A = { a,b,c }, $|B|$ = {1,2} Of all the relations from A to B identify which relations are many one, one many and one-one and represent these diagramatically.

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15. Are the following sets relation ? ϕ from A to B . Determine the domain range and inverse of each of the relations mentioned above.

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16. Are the following sets relation ? $A \times B$ from A to B.Determine the domain and range of each of the relations mentioned above.

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17. Are the following sets relation ? $A \times \phi$ from A to ϕ. Determine the domain range and inverse of each of the relations mentioned above.

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18. Are the following sets relation ? ϕ * B from ϕ to B.

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19. Are the following sets relation ? $\phi \times \phi$ from ϕ to ϕ. Determine the domain range and inverse of each of the relations mentioned above.

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20. Are the following sets relation ? ϕ x C` from A to B . Determine the domain range and inverse of each of the relations mentioned above.

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21. Are the following sets relation ? $\phi \times \phi$ from A to B. Determine the domain range and inverse of each of the relations mentioned above.

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22. Express the following relations on A to B in each case in tabular form : A = { n $\in$ N : n $\leq$

10 } , B = N

f= {(x,y) $\in A \times B : y = x^2$}

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23. Express the following relations on A to B in each case in tabular form A = B = R

f = {(x,y) : x^2 + y^2 = 1 and $|x - y|$ = 1 }

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24. Express the following relations on A to B in each case in tabular form {1,2,3,4}, B = {1,2,3,4,5} f = {(x,y) : 2 divides 3x+y}

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25. A and B arenon-empty sets such that $|A|$ = m, $|B|$ = n. How many relations can be defined from A to B ? (Remember that the number of relations is the number of subsets of $A \times B$) .

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26. Give an example of a relation f such that dom f = rng f

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27. Give an example of a relation f such that dom f $\subset$ rng f

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28. Give an example of a relation f such that dom f $\supset$ rng f

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29. Give an example of a relation f such that dom f $\cup f^{-1} = \phi$

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30. Give an example of a relation f such that f = f^{-1}

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31. Give an example of a relation f such that f $\cap f^{-1} \neq \phi$

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32. Let R = {(a,a^3) | a is a prime number less than 10 } Find R.

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33. Let R = {(a,a^3) | a is a prime number less than 10 } dom R.

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34. Let R = {(a,a^3) | a is a prime number less than 10 }.Find rng R.

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35. Let R = {(a,a^3) | a is a prime number less than 10 }. Find R^(-1).

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36. Let R = {(a,a^3) | a is a prime number less than 10 }.Find dom R^(-1).

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37. Let R = {(a,a^3) | a is a prime number less than 10 }.Find rng R^(-1).

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38. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find R.

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39. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find dom R.

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40. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find rng R.

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41. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find R^{-1}.

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42. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find Dom R^{-1}.

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43. Let A = {1,2,3,4,5,6} and Let R be a relation on A defined by R {(a,b)| a divides b} Find rng R^{-1}.

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44. Give an example of a relation which is not a function.

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45. If X and Y are sets containing m and n elements respectively then what is the total number of function from X to Y ?

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46. Find the domain of the following functions

: $\sqrt{9-x^2}$

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47. Find the domain of the following functions

: $x/\left(1+x^2\right)$

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48. Find the domain of the following functions

: $1 - |x|$

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49. Find the domain of the following functions

: `1/ (x^2-1)

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50. Find the domain of the following functions

: $(\sin x)/(1+\tan x)$

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51. Find the domain of the following functions

: $x/|x|$

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52. Find the domain of the following functions

: $\frac{1}{x + |x|}$

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53. Find the domain of the following functions

: [x] - x

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54. Find the domain of the following functions

: $\frac{1}{\sqrt{1-x^2}}$

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55. Find the domain of the following functions

: log(sinx)

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56. Find the range of the following functions :

$x^2 - 1/x^2 + 1$

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57. Find the range of the following functions :

$\sqrt{x-1}$

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58. Find the range of the following functions :

[x] - x

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59. Find the range of the following functions :

$$\frac{x}{1-x}$$

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60. Find the range of the following functions :

$x / \left(1 + x^2\right)$

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61. Find the range of the following functions :

$1/2 - \cos 3x$

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62. Find the range of the following functions :

log_10 (1-x)

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63. Find the range of the following functions :

$\sqrt{1+x^2}$

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64. Find the domain and range of the following functions : $x^2 / \left(1 + x^2\right)$

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65. Find the domain and range of the following functions : $\sqrt{2x - 3}$

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66. Find the domain and range of the following functions : $\log_e|x-2|$

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67. Give an example of a step function on [-1,3]

= $\{x \in R, \ -1 \leq x \leq 3\}$

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68. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are functions and which are not and why ?

{(a,1),(a,2),(b,3),(b,4)}

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69. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are functions and which are not and why ?

{(a,2),(b,3),(c,4)}

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70. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are functions and which are not and why ?

{(a,3),(b,1),(a,4),(c,2)}

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71. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are

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72. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are functions and which are not and why ?

{(a,2),(b,1),(c,1)}

73. Let X {a,b,c} , Y = {1,2,3,4}

Find Out which of the following relations are functions and which are not and why ?

{(a,a),(b,b),(c,c)}

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74. Find the domain and range of those relations in a which are functions.

{(a,1),(a,2),(b,3),(b,4)}

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75. Find the domain and range of those relations in a which are functions.

{(a,2),(b,3),(c,4)}

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76. Find the domain and range of those relations in a which are functions.

{(a,3),(b,1),(a,4),(c,2)}

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77. Find the domain and range of those relations in a which are functions.

{(a,1),(b,1),(c,1)}

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78. Find the domain and range of those relations in a which are functions.

{(a,2),(b,1),(c,1)}

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79. Find the domain and range of those relations in a which are functions.

{(a,a),(b,b),(c,c)}

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80. Identify the constant function if any.

{(a,1),(a,2),(b,3),(b,4)}

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81. Identify the constant function if any.

{(a,2),(b,3),(c,4)}

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82. Identify the constant function if any.

{(a,3),(b,1),(a,4),(c,2)}

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83. Identify the constant function if any.

{(a,1),(b,1),(c,1)}

84. Identify the constant function if any.

{(a,1),(b,1),(c,1)}

85. Identify the constant function if any.

{(a,a),(b,b),(c,c)}

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86. Identify the identity function if any.

{(a,1),(a,2),(b,3),(b,4)}

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87. Identify the constant function if any.

$\{(a,2),(b,3),(c,4)\}$

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88. Identify the constant function if any.

$\{(a,3),(b,1),(a,4),(c,2)\}$

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89. Identify the constant function if any.

{(a,1),(b,1),(c,1)}

90. Identify the constant function if any.

{(a,1),(b,1),(c,1)}

91. Identify the constant function if any.

{(a,a),(b,b),(c,c)}

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92. Find $f(\sqrt{2})$ and $f(-\sqrt{3})$ for the function

$$f(x)=\begin{cases} x^2, & \text{if } x<0 \\ x, & \text{if } 0\le x\le 1 \\ \frac{1}{x}, & \text{if } x>1 \end{cases}$$

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93. Find x for which the value of f(x) = $x^2 - 4x + 3$ is 0.

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94. Find x for which the value of f(x) = $x^2 - 4x + 3$ is -1.

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95. Find the value/values of x for which the following are not defined.

$\left(x^2 - 4\right) / (x - 2)$

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96. Find the value/values of x for which the following are not defined.

$$\frac{\sin x}{x}$$

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97. Find the value/values of x for which the following are not defined.

$$\frac{\log \cos x}{\sec x}$$

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98. Let f(x) = $\sqrt{1+x}$, g(x) = $\sqrt{1-x}$ Find f + g also find the domain of the each case.

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99. Let f(x) = $\sqrt{1+x}$, g(x) = $\sqrt{1-x}$ Find f - g

also find the domain of the each case.

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100. Let f(x) = $\sqrt{1+x}$, g(x) = $\sqrt{1-x}$ Find fg

also find the domain of the each case.

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101. Let f(x) = $\sqrt{1+x}$, g(x) = $\sqrt{1-x}$ Find $\frac{f'}{g}$

also find the domain of the each case.

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102. If f(x) = $\log_e\left(\frac{1-x}{1+x}\right)$, then prove that $f(x)+f(y)=f\left(\frac{x+y}{1+xy}\right)$

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103. Let f = {(-1,4),(2,7) , (-2,11)} , (0,1), (1,2) be a quadratic polynomial from Z to Z, find f(x).

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104. Sketch the graphs of the following functions.

f(x) = x^3

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105. Sketch the graphs of the following functions.

f(x) = $1 + \frac{1}{x^2}$

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106. Sketch the graphs of the following functions.

f(x) = $(x - 1)^2$

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