MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

RELATIONS , FUNCTIONS AND BINARY OPERATIONS

Question Bank

1. If A = {1,3,5,7}, B ={2,5), find the number of relations from A to B

2. Let R be the relation on Z defined by R = $\{(a, b), a, b \in Z, a^2 = b^2\}$ Find R

3. Let R be the relation on Z defined by R = $\{(a, b), a, b \in Z, a^2 = b^2\}$ Find Domain of R

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4. Let R be the relation on Z defined by R = $\{(a, b), a, b \in Z, a^2 = b^2\}$ Find Range of R.

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5. Consider the relation $\perp$ (perpendicular) on a set L of lines in plane. Show that this relation is symmetric and neither reflexive nor transitive.

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6. Test whether the following relation is reflexive, symmetric, transitive, R_3 on R defined by $(a,b) \in R_3 \Leftrightarrow a^2 - 4ab + 3b^2 = 0$.

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7. Let R be the relation of congruency on the set A of all triangles in a plane. Show that the relation Ris an equivalence relation .

8. Let m be fixed positive integer. Tow integers a amd are said to be congruent modulo m, written a=b (modm) if m divides a- b .Show that the relation of congruent modulo m is an equivalence relation .

9. Show that the number of equivalence relation on the set (1,2,3) containing (1,2) and (2,1) is tow .

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10. Let A={1,2,3....,19,20}. Let R be the equivalence relation on $A \times A$ defined by (a,b) R(c,d) iff ad = bc .Find the equivalence classes of (1,3)and (4,1).

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11. Let $f: R \to R$ be defined as

$$\begin{cases} 2x & +1 & x \leq 4 \\ X & + & 4x \geq 4 \end{cases}$$ Show that f is not a

function .

12. Whether the following function are to :

$R \to R_+$ defined by $f f(x) = \sqrt{x^2}, x \in R$

13. Let A be a finite set. If $f: A \to A$ is onto

show that f is one- one.

14. Let $f: R \to R$ be a function defined by

f(x)=cos(2x+3). Show that this function is neither

one- one nor onto.

15. Let $f(x) = \dfrac{ax}{x-1}$, $x \neq -1$.If 10f(x)=x, find the value of a.

16. Let f be function defined on [0,1] defined by:

$$f(x) = \{(x, \quad \text{if} \quad , x, \in, q), (1-x, \quad \text{if} \quad , x \neq q)$$

.Show that $10f(x) = x$ for $x \in [0, 1]$.

17. Find the domain and range of the following function : $\sqrt{(x-1)(3-x)}$

18. If $f(x) = \sqrt{8x}$, $g(x) = x + 2$, then

19. Let A=[-1,1] and f:$A \rightarrow A$ be a function defined by f(x) =x$|x|$. Show that f is a rejection .

20. Show that the function f:$N \rightarrow N$ defined by

f(x)=$x^2 + x + 1 \in N$is not invertible.

21. Let $y=\{n^2 : n \in N\}$subeN. consider f:

$N \rightarrow Y$ as f(n)=n_2. Show that is invertible. Find

the inverse of f.

22. Let f :R R-$\left\{\dfrac{3}{5}\right\} \to R - \left\{\dfrac{2}{5}\right\}$ be a function defined as f (x)= $\dfrac{2x}{5x+3}$.Find the inverse of the function f.

23. Let A= $\left\{a + \sqrt{5}b : a, b \in Z\right\}$. Show that usual multiplication of numbers is binary operation on A

24. Let be binary operation on the set R defined by a*b = a+b+ab, a, $b \in R$. solve equation :2* (2*x)=7

25. Number of binary opertions on the set $\{a, b\}$ are

26. Let * be a binary operation on N defined by $a*b=2^{5ab}$, $ab \in N$.Discuss the commutativity if this binary operation.

27. Let A=N x N and *be a binary operation on A defined by (a,b)*(c,d) =(a+c,b+d).Show(A*) has on identity element.

28. Let * be a binary operation on Zdefined by $a*b=a+b-$ 15 for $a, b \in Z$.Show that *is associative

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29. Let * be a binary operation on Zdefined by $a*b=a+b-$ 15 for $a, b \in Z$. Show that *is commutative

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30. Let * be a binary operation on Zdefined by

a*b=a+b- 15 for $a, b \in Z$. Find the identity

element in (Z,*)

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31. Let * be a binary operation on Zdefined by

a*b=a+b- 15 for $a, b \in Z$ Find the inverse of an

element in (Z ,*).

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32. Let A= $Q \times Q$. Let * be a binary operation

Defined by: (a,b)*(c,d)= (ac,ad +b). Then

(i) find the identity element of (A,*)

33. Let A= $Q \times Q$. Let * be a binary operation

Adifined by: (a,b)*(c,d)= (ac,ad +b). Then

find the invertible elements of (A,*)