doubtnut
India's Number 1 Education App

MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

SETS AND RELATIONS

Question Bank

1. If A=$\{x : x = 4n + 1, n \leq 5$ and $n \in N\}$ and

B=$\{3n : n \leq 8$ and $n \in N\}$ then (A-B) is

A. {5,9,13}

B. {5,13,17,21}

C. {9,17,21}

D. {5,13,21}

Answer: B

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2. If $p=\left\{(x, y) \in AXA : x = \sqrt{y}\right\}$ be a relation on a set $A = \{x \in N : 2 \leq x \leq 16\}$ then the domain of p is

A. {2,9,16)

B. {2,3,4}

C. {4,9,16}

D. {2,9}

Answer: B

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3. A={a,b,c} and B={1,2,3} are two sets R={(a,1), (a,2),(b,2),(b,3),(c,1)} be a subset of $A \times B$ then R is a

A. mapping

B. relation

C. mapping and relation

D. none of these

Answer: B

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4. A mapping f is defined : $f:(x,y)\to(x+y,x-y)$ then f(-1,-2) is equal to

A. (-3,1)

B. (-3,-1)

C. (3,1)

D. (3,-1)

Answer: A

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5. Which of the following is a mapping from A to B where A={1,2,3} and B={2,3,4}?

A. a) {(1,2),(2,3),(3,4),(2,2)}

B. b) {(1,2),(2,3),(1,3)}

C. c) {(1,3),(2,3),(3,3)}

D. d) {(1,1),(2,3),(3,4)}

Answer: C

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6. If $A = \{x : 0 < x < 4\}$ and B= $\{x : 3 \leq x \leq 6\}$ where x is an integer then $A \cap B$ is

A. {2}

B. {3}

C. 3

D. ϕ

Answer: B

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7. State which of the following is true

A. $\phi \in \{0\}$

B. $0 \in \phi$

C. $\phi \subseteq \{0\}$

D. $\{0\} \subseteq \phi$

Answer: C

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8. If S={0,1,4,5,7}then the number of subsets of S is

A. 25

B. 16

C. 30

D. 32

Answer: D

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9. If R={(1,-1),(2,0),(3,1),(5,3)} is a relation then R^{-1} is

A. {(-1,1),(2,0),(1,3),(5,3)}

B. {(-1,1)(0,2),(1,3),(3,5)}

C. {(1,-1)(0,2),(1,3),(3,5)}

D. {(-1,1),(0,2),(1,3),(5,3)}

Answer: B

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10. If S={1,2,3,4,....10} be a universal set and A={1,2,5} and B={6,7} then $A \cap B^c$ is

A. B^c

B. A

C. A^c

D. B

Answer: B

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11. If aN={ax:x in N(natural number)} then $3N \cap 7N$ is equal to

A. 21N

B. 10N

C. 4N

D. 14N

Answer: A

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12. Set A={a,b,c,d} then the number of defined relation in A is

A. 24

B. 16

C. 4^4

D. 2^{16}

Answer: D

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13. If for two sets A and B,A-B=A then which of the following is true?

A. $B \subset A$

B. $A \subset B$

C. $A \cap B = \phi$

D. $B - A = \phi$

Answer: C

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14. The set of all positive odd numbers divisible by 2 is

A. ϕ

B. $\cup$

C. {0}

D. $\{\phi\}$

Answer: A

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15. If A and B are two finite sets and n(A)=5,n(B)=6 then the minimum number of elements of the set $A \cup B$ is

A. 6

B. 9

C. 5

D. 11

Answer: A

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16. If $A = \{(x, y) : x^2 + y^2 = 25\}$ and $B = \{(x, y) : x^2 + 9y^2 = 144\}$ then $n(A \cap B)$ is

A. 1

B. 3

C. 2

D. 4

Answer: D

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17. A=$\left\{(x, y) \in R^2 : x \neq 0 \text{ and } y = \left(\frac{1}{x}\right)\right\}$ and B=$\{(x, y) \in R^2 : y = -x\}$ then $A \cap B$

is equal to

A. a doubleton set

B. ϕ

C. a singleton set

D. none of these

Answer: B

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18. If pN={px:x is a natural number} then $4N \cap 10N$ is equal to

A. 40N

B. 10N

C. 20N

D. 4N

Answer: C

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19. For any two nonempty sets A and B , $(A \cup B)' \cup (A' \cap B)$ is equal to

A. A'

B. B'

C. ϕ

D. $A' \cup B'$

Answer: A

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20. If A={0,1} and B={0,-1} then show that $A \times B \neq B \times A$

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21. If the ordered pairs (x-2,2y+1) and (y-1,x-2) be equal then find x,y

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22. If the sets A,B are such that $A \cup B = B \cap A$ thrn show that A=B

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23. If A={1,2,3,4} nd B={2,4,6,8} then find $n(A \cup B)$

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24. Show that $n(P(P(P(\phi)))) = 4$

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25. If mRn={(m,n):(m-n) is divisible by 5} then find $(3Rn) \cap (5Rn)$

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26. If f(x)=3x-5 and $x \in \{-1, 0, 1, 3, 4\}$ then find the range of f

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27. If A=$\{x : x^2 = 9 \text{ and } 2x = 3\}$ then find set A

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28. For any set A,B prove that $A \cap (B - A) = \phi$

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29. If A={2,3,5} and B={2,5,6} then $(A \cap B) \times (A - B)$=

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30. If A= {a,b} B={p,q} then how many relation are there from set A to set B?

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31. $P = \{(x, y) : x, y \in N \text{ and } 3x + 2y = 15\}$ is a relation on a set of natural number N find (i) P and (ii) P^{-1}

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32. If $B \subseteq A$ then prove that $B - A = \phi$

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33. Let A={1,2,3,5} and B={4,6,9} let $R = R = \{(x, y) : |x - y|$ is odd `x in A,y in B}

write R in the roster form

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34. Find the domain and range of the relation

$R = \{(a, b) : a + b = 10, a, b \in N\}$

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35. If $A = \{x : 0 < x < 4\}$ and $B = \{x : 3 \leq x < 6\}$ where x is an integer then show that $A \cap B = \{3\}$

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36. If A,B,C are three non empty sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$ then prove that B=C

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37. If A={1,2,3} ,B={3,4} and C={1,3,5} find $A \times (B \cup C)$

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38. If A and B be any two subsets of the set S then show that $(A \times B) \cap (A \times B') = \phi$

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39. If $f: R \to R$ be defined by $f(x) = x^2 + 3$ where R is the set of real numbers then show that $f^{-1}(7) = \{-2, 2\}$ and $f^{-1}(19) = \{-4, 4\}$

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40. Twos ets A and B are such that n(A)=3 nad n(B)=6 find the least value as well as the greatest values of $n(A \cup B)$

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41. A survey is taken of 100 boys in a village it is found that 35 boys use motor cycles 45 boys use cycles and 10 boys use both of them find how many boys

and have none of them

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42. A survey is taken of 100 boys in a village it is found that 35 boys use motor cycles 45 boys use cycles and 10 boys use both of them find

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43. Out of 70 members of a family 37 drink coffee and 52 drink tea how many members drink both tea and coffee?

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44. A class has 175 students following is the description showing the number of students studying one or more of the following subjects in this class mathematics 100 physics 70 chemistry 46 mathematics and physics 30 mathematics and chemistry 28 physics and chemistry 23 mathematics physics and chemistry 18.how many students are enrolled in mathematics alone physics alone and chemistry alone?are there students who have not offered any of these three subjects.

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45. Of the members of three athletic teams in a certain school 21 are on the basketball team, 26 on the hockey team and 29 on the football team. 14 play hockey and basketball, 15 play hockey and football , 12 play football and basketball, 8 are on all the three teams how many are they altogether?

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46. If A is not a null set and AxB=AxC then prove that B=C

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47. If R be the relation on the set A of first twelve natural numbers defined by $R = \{(x, y) : x + 2y = 12, \text{ and } x, y \in A\}$ find R as the set of ordered pairs also find its range.

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48. Find the range and domain of the relation R defined $R = \{(2x - 5, x - 3) : x)$ is an even natural number less than 12}

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49. If n(S) =700 ,n(A)=200,n(B)=300 , $n(A \cap B) = 100$ then find the value of $n(A^c \cap B^c)$

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50. A survey of americans show that $63\,\%$ of them like cheese and $76\,\%$ of the like apple if $x\,\%$ of the nation like both of them then find the value of x

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51. If $f:[1,\infty)\to[2,\infty)$ is defined as $f(x)=x+\left(\frac{1}{x}\right)$ then find $f^{-1}(x)$

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52. For three sets A,B,C prove that

$A-(B\cup C)=(A-B)\cap(A-C)$

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53. If U={1,2,4,6, 8,16,32} A={2,6,32} and B= {1,4,8,16} then verify that

$(A\cup B)'=A'\cap B'$

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54. If U={1,2,4,6,8,16,32} A={2,6,32} and B={1,4,8,16} then verify that

$(A \cap B)' = A' \cup B'$

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55. Using set algebra find the H.C.F and L.C.M of the numbers 6,42, and 105.

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56. Prove that if A,B are any sets then A-B, $A \cap B$ and B-A are mutually disjoint.

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