



MATHS

BOOKS - PATHFINDER MATHS (BENGALI ENGLISH)

SET, VENN DIAGRAM AND RELATION

Question Bank

1. A market research group conducted a survey of 1000 consumers and reported that 720 consumers like product A and 450 consumers like product B what is the least number that must have liked both products ?

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2. A college awarded 38 medals in football, 15 in basketball and 20 in cricket. If these medals went to a total of 58 men and only three men got medals in all the three sports, how many received in exactly two of the three sports?



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3. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1 , 50 to chemical C_2 and 30 to both the chemicals C_1 and C_2 . Find the number of individuals exposed to Chemicals C_1 but not chemical C_2 .



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4. There are 200 individuals with a skin disorder, 120 had been exposed to the chemical C_1 , 50 to chemical C_2 and 30 to both the

chemicals C_1 and C_2 . Find the number of individuals exposed to Chemical C_2 but not chemical C_1 .



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5. There are 200 individuals with a skin disorder ,120 had been exposed to the chemical C_1 , 50 to chemical C_2 and 30 to both the chemicals C_1 and C_2 . Find the number of individuals exposed to Chemical C_1 or chemical C_2 .



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6. Out of 500 car owners investigated 400 owned car A and 200 owned car B , 50 owned both A and B cars. is this data correct?



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7. If $(x+y, y-2) = (3, 1)$, find the values of x and y .



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8. Let $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$ Find $A \times (B \cap C)$



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9. Let $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$ Find $(A \times B) \cap (A \times C)$



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10. Let $A = \{1, 2, 3\}$, $B = \{3, 4\}$ and $C = \{4, 5, 6\}$ Find $A \times (B \cup C)$



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11. Let $A = \{1,2,3\}$, $B = \{3,4\}$ and $C = \{4,5,6\}$ Find $(A \times B) \cup (A \times C)$

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12. If $P = \{1,2\}$, form set set $P \times P \times P$

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13. Sixty five percent of children in a sport club play football,70 percent play volleyball and 75 play basketball. What is the smallest percentage of children playing all the three games ?

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14. A survey shows that 63 % of the indians like cheese where as 76 % like apples. If x % of the indians like both cheese and apples,

find the values of x



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15. Let A and B be two sets such that $A \cup B = A$. Then $A \cap B$ is equal to

A. ϕ

B. B

C. A

D. none of these

Answer: B



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16. If A and B are two sets then $(A - B) \cup (B - A) \cup (A \cap B)$ is equal to

A. $A \cup B$

B. $A \cap B$

C. A

D. B'

Answer: A



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17. Let A and B be two sets . Then $(A \cup B)' \cup (A' \cap B)$ is equal to

A. A'

B. A

C. B'

D. none of these

Answer: A



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18. If $A =]2,4[$ and $B = [3,5[$, then find $A \cap B$

A. $[3,4]$

B. $[3,4[$

C. $]3,4[$

D. none of these

Answer: B



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19. If $A = \{x : x \in N, \text{isafac} \rightarrow \text{rof6}\}$ and $B = \{x \in N : x \text{isafac} \rightarrow \text{rof8}\}$, then $B-A$ is equal to

A. $\{4,8\}$

B. $\{2,4\}$

C. $\{1,2\}$

D. none of these

Answer: A



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20. If A and B are two sets such that $n(A) = 27$, $n(B) = 35$ and $n(A \cup B) = 50$, then $n(A \cap B) =$

A. 10

B. 15

C. 35

D. none of these

Answer: D



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21. Let U be the universal set and $A \cup B \cup C = U$, Then

$\{(A - B) \cup (B - C) \cup (C - A)\}'$ is equal to

A. $A \cup B \cup C$

B. $A \cup (B \cap C)$

C. $A \cap B \cap C$

D. $A \cap (B \cup C)$

Answer: C



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22. 20 teachers of a school either teach mathematics or physics. 12 of them teach mathematics while 4 teach both the subjects. Then the number of teachers teaching only physics is

A. 12

B. 8

C. 16

D. none of these

Answer: B



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23. of the members of three athletic teams in a school, 21 are in the cricket team ,26 are in the hockey team and 29 are in the football team.Among them ,14 play hockey and cricket. Eight play all the three games. The total number of members in the three athletic team is

A. 43

B. 76

C. 49

D. none of these

Answer: A



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24. In a B school there are 15 teachers who teach marketing or finance. Of these 8 teach finance and 4 teach both marketing and finance . How many tech marketing but not finance ?

A. 15

B. 20

C. 11

D. none of these

Answer: D



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25. If X and Y are two sets such that $(X \cup Y)$ has 60 elements, X has 38 elements and Y has 42 elements, how many elements does $(X \cap Y)$ have ?

A. 11

B. 20

C. 13

D. none of these

Answer: B



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26. In a school 80 students like chocolate , 40 like coffee if the number of the student does not like any of hem is equal to the number of student who like both of them then what is the total number of students in the school ?

A. 115

B. 90

C. 120

D. none of these

Answer: C



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27. There are 200 students in a B school, 120 have been taken in project of finance, 50 in project of marketing and 30 in both the marketing and finance. Find the number of student worked on marketing but on finance

A. 20

B. 30

C. 40

D. none of these

Answer: A



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28. In a school 50 student play cricket , 70 play football while 30 play none of the games, if total number of students are 100 then how many of them play only cricket

A. 15

B. 20

C. 10

D. none of these

Answer: D



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29. In a school there are 100 students 60 of them don't like chocolate and 50 don't like Biscuit and 10 of them like none then how many of them like both ?

A. 20

B. 30

C. 40

D. none of these

Answer: D



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30. A dinner party is to be fixed for a group of 100 persons. In this party, 50 persons do not prefer fish, 60 prefer chicken and 10 do not prefer either chicken or fish. The number of persons who prefer both fish and chicken is

A. 20

B. 22

C. 25

D. none of these

Answer: A



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31. In an examination 62% of the candidates failed in English , 42% in mathematics and 20% in both, The number of those who passed in both the subjects is

A. 11

B. 16

C. 18

D. none of these

Answer: B



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32. In a market research project, 20 % opted for *Nirma* detergent where as 60 % opted for 'Surf excel' detergent .The remaining individuals were not certain. If the difference between those who opted for 'Surf blue' and those who were uncertain was 720 how many respondents were covered in the survey

A. 1100

B. 1150

C. 1300

D. none of these

Answer: D



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33. In 2002, according to a news poll, 36 % of the voters had learning towards party 'Y'. In 2004 this figure rose to 46 % . But in another survey the percentage was down to 40 % Therefore the party 'Z' is likely to win the next election. Which of the following,If true, would seriously weaken the above conclusion ?

- A. People tend to switch their votes at the last minute.
- B. It has been showed that 85 % of the voters belonging to the party 'Y' vote in an election as compared to 80 % of the voters belonging to party 'Z'
- C. 35 % of people favour party 'Z'
- D. No one can predict how people will vote

Answer: C



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34. A survey shows that 61%, 46%, and 29% of the people watched '3 Idiots', 'Raj ≠ eti', 'Avatar' respectively. 25% of the people watched exactly two of the three movies and 3% watched none. What percentage of people watched all the three movies?

- A. 39%
- B. 11%
- C. 14%
- D. 7%

Answer: D



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35. Let r be relation over the set $N \times N$ and it is defined by

$(a, b)r(c, d) \Rightarrow a + d = b + c$. Then r is

- A. reflexive only
- B. symmetric only
- C. transitive only
- D. an equivalence relation

Answer: D

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36. Let $A = \{1, 2, 3\}$. The number of distinct relations that can be defined over A is

A. 2^9

B. 6

C. 8

D. none of these

Answer: A



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37. On the set $A = \{(1,3) (4,2) (2,4) (2,3) (3,1)\}$. The relation R is

A. a function

B. transitive

C. not symmetric

D. reflexive

Answer: C



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38. Let $R = \{(3,3) (6,6) (9,9) (12,12) (6,12),(3,9) (3,12) (3,6)\}$ be a relation on the set $A = \{3,6,9,12\}$ the relation is

- A. reflexive only
- B. reflexive and transitive only
- C. reflexive and symmetric only
- D. an equivalence relation

Answer: A



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39. R is a relation over the set of real numbers and it is given by $mn \geq 0$. Then R is

- A. symmetric and transitive
- B. reflexive and symmetric
- C. a partial-order relation
- D. an equivalence relation

Answer: D



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40. Let R be the relation over the set of integers such that mRn if and only if m is a multiple of n. Then R is

- A. reflexive

B. symmetric

C. transitive

D. an equivalence relation

Answer: A::C



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41. Let $A = \{1,2,3,4\}$ and R be a relation in A given by $R = \{(1,1) (2,2) (3,3) (4,4) (1,2) (2,1) (3,1) (1,3)\}$. Then R is

A. reflexive

B. symmetric

C. transitive

D. an equivalence relation

Answer: A::B



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42. Let R be the relation over the set of straight lines of a plane such that $l_1 R l_2 \Leftrightarrow l_1 \perp l_2$. Then R is

- A. symmetric
- B. reflexive
- C. transitive
- D. an equivalence relation

Answer: A



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43. Consider a universal set $U = \{1, 2, 3, 4, \dots, 10\}$

Set $P = \{x \mid x \text{ is a prime number}\}$

Set E = {2,4,6,8,10}

Set O = {1,3,5,7,9}

Set C = {x | x is a composite number}

How many elements does P' or P^c has, or find $n(P')$

A. 3

B. 5

C. 6

D. none of these

Answer: C



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44. Consider a universal set $U = \{1,2,3,4,\dots,10\}$

Set P = {x | x is a prime number}

Set E = {2,4,6,8,10}

Set O = {1,3,5,7,9}

Set C = {x | x is a composite number}

Find the number of elements in E-C

A. 3

B. 2

C. 4

D. none of these

Answer: D



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45. If in Praxis Business school 40 students like chocolate while 30 like cake, if there are 10 students who like both and an equal number of students who like none of them.

Find the total number of students at Praxis Business school.

A. 65

B. 70

C. 85

D. none of these

Answer: B



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46. If in praxis Business school 40 students like chocolate while 30 like cake, if there are 10 students who like both and an equal number of students who like none of them.

What percentage of student do not like cake ?

A. 57.14 %

B. 25.12

C. 55.55

D. none of these

Answer: A

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

$A \cap B^c$ is

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48. If $A = \{x : x \in \mathbb{N} \text{ and } x \text{ is even}\}$

$B = \{x : x \in \mathbb{N} \text{ and } x \text{ is prime}\}$

then the element of $B \cap C$ is

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49. If the number of all possible subsets of $A = \{-1,0,1\}$ is 2^n , then n is equal to

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50. If A and B are two sets containing 3 and 6 elements respectively. What can be maximum number of elements in $A \cup B$?

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51. For any three sets A, B, C prove that following (by using different laws on operating of sets): ,

$$A - B = B' - A'$$

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52. For any two sets A,B prove that following :

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



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53. For any three sets A,B,C prove that following ,

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



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54. Shade the following sets :

$$A' \cup B'$$



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55. Shade the following sets :

$$A' \cap B'$$

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56. In a group of 70 people, 37 like coffee, 52 like tea and each person likes at least one of the two drinks .How many people like both coffee and tea?

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57. If 53 % of persons like oranges where 66 % like apples, what can be said about the percentage of persons who like both oranges and apples?

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58. Let A has 3 elements and B has 6 elements What can minimum number of elements in $A \cup B$

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59. In a group of 2000 people there are 1500, who can speak Hindi and 800, who can speak Bengali. How many can speak Hindi only ?
How many can speak Bengali only?

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60. 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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61. In a committee 50 people speak Hindi , 20 speak English and 10 speak both Hindi and English. How many speak at least one of these two languages?

A. 40

B. 60

C. 70

D. none of these

Answer: B

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62. In an examination 56 % of the candidates failed in English and 48 % Failed in Science. If 18 % failed in both English and Science ,find the percentage of those wgo passed in both the subjects.

A. 13

B. 14

C. 15

D. none of these

Answer: B



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63. A school awarded 42 medals in hockey, 18 in basketball and 23 in cricket. If these medals were bagged by a total of 65b students and

only 4 students got medals in all the three sports , How many students received medals in exactly two of the three sports?

A. 22

B. 23

C. 24

D. none of these

Answer: A



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64. A survey shows that 73% of the Indians like apples whereas 65% like oranges , What percentage of Indians like both apples and oranges ?

A. 28

B. 38

C. 48

D. none of these

Answer: B



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65. Suppose A_1, A_2, \dots, A_{30} are thirty sets each with five elements and B_1, B_2, \dots, B_n are n sets each with three elements such that $\bigcap_{i=1}^{30} A_i = \bigcap_{j=1}^n B_j = S$. If each element of S belongs to exactly ten of the A_i 's and exactly nine of the B_j 's then the value of n is

A. 15

B. 135

C. 45

Answer: C

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66. Let $A = \{1,2,3\}$, $B = \{3,4\}$, $C = \{4,5,6\}$ Then $A \cup (B \cap C)$ is

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67. If $A = \{2,3,5\}$, $B = \{2,5,6\}$, then find $(A - B) \cap (A \cap B)$

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68. If $A = \{x : x^2 - 5x + 6 = 0\}$, $B = \{2,4\}$, $C = \{4,5\}$, then $A \times (B \cap C)$ is

A. $\{(2,4), (3,4)\}$

B. $\{(2,4), (4,4)\}$

C. $\{(2,4), (2,3)\}$

D. none of these

Answer: A



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69. If $n(A) = 4$, $n(B) = 3$, $n(A \times B \times C) = 24$, then $n(C)$ is

A. 2

B. 3

C. 4

D. none of these

Answer: A



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70. n/m means that n is factor of m , then the relation 'f' is

- A. Reflexive and symmetric
- B. Transitive and symmetric
- C. Reflexive, transitive and symmetric
- D. Reflexive, transitive and not symmetric

Answer: B



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71. If $A = \{2,4\}$ and $B = \{3,4,5\}$ then $(A \cap B) \times (A \cup B)$ is



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72. In the set $A = \{1,2,3,4,5\}$, a relation R is defined by $R = \{(x,y):x,y \in A \text{ and } x < y\}$ Then R is

- A. Reflexive and symmetric
- B. symmetric
- C. transitive
- D. none of these

Answer: C

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73. In the set $X = \{a,b,c,d\}$ which of the following relations represents a function ?

A. $R_1 = \{(b,a),(a,b),(c,d),(a,c)\}$

B. $R_2 = \{(a,d),(d,c),(b,b),(c,c)\}$

C. $R_3 = \{(a,b),(b,c),(c,d),(b,d)\}$

D. $R_4 = \{(a,a),(b,b),(c,c),(a,d)\}$

Answer: B



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74. Two finite sets A and B are having m and n elements. The total number of subsets of the first set is 56 more than the total number of subsets of the second set. The value of m and n are respectively.

A. 7,6

B. 6,3

C. 5,1

D. 8,7

Answer: B



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75. Let A be a set containing 10 distinct element, then total number of distinct function from A to A is



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76. A set contains n elements. The power set contains

A. n elements

B. 2^n elements

C. n^2 elements

D. none of these

Answer: B



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77. Let S be a set containing n elements. Then the total number of binary operations on S is

A. n^n

B. 2^{n^2}

C. n^{n^2}

D. n^2

Answer: C



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78. The number of surjections from $A = \{1, 2, \dots, n\}$, $n \geq 2$ onto $B = \{a, b\}$ is

A. ${}^n P_2$

B. $2^n - 2$

C. $2^n - 1$

D. none of these

Answer: B



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79. Set A has 3 elements and set B has 4 elements. The number of injections that can be defined from A to B is

A. 144

B. 12

C. 24

D. 64

Answer: C



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80. The relation 'less than' in the set of natural numbers is

A. only symmetric

B. only transitive

C. only reflexive

D. equivalence relation

Answer: B



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81. If A and B are two sets then $A \cap (A \cap B)$ equals

A. A

B. B

C. ϕ

D. none of these

Answer: A



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82. If R is a relation from a set A to t B and S is a relation form B to a set C then the relation $S \circ R$

A. is from A to C

B. is from C to A

C. does not exist

D. none of these

Answer: A



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83. Let $R = \{(1,3),(2,2),(3,2)\}$ and $S = \{(2,1),(3,2),(2,3)\}$ be two relations on set $A = \{1,2,3\}$. Then $R \circ R$ is equal

A. $\{(2,3),(3,2),(2,2)\}$

B. $\{(1,3),(2,2),(3,2),(2,1),(2,3)\}$

C. $\{(3,2),(1,3)\}$

D. $\{(2,3),(3,2)\}$

Answer: A



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84. Let $X = \{1,2,3,4,5\}$ and $Y = \{1,3,5,7,9\}$. Which of the following is /are relations from X to Y ?

A. $R_1 = \{(x, y) : y = 2 + x, x \in X, y \in Y\}$

B. $R_2 = \{(1, 1), (2, 1), (3, 3), (4, 3), (5, 5)\}$

C. $R_3 = \{(1, 1), (1, 3), (3, 5), (3, 7), (5, 7)\}$

D. $R_4 = \{(1, 3), (2, 5), (2, 4), (7, 9)\}$

Answer: A::B::C



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85. Which one of the following is not true?

A. $A - B \subseteq A$

B. $B' - A' \subseteq A$

C. $A \subseteq A - B$

D. $A \cap B' \subseteq A$

Answer: C



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86. If I be the set of integers and if the relation R be defined over I by $a R b$ iff $a-b$ is an even integer, $a, b \in I$ the relation R is

A. reflexive

B. anti-symmetric

C. symmetric

D. equivalence

Answer: A::C::D



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87. Let R and S be two non-void relations on a set A . Which of the following statements is false?

- A. R and S are transitive $\Rightarrow R \cup S$ is transitive
- B. R and S are transitive $\Rightarrow R \cap S$ is transitive
- C. R and S are symmetric $\Rightarrow R \cup S$ is symmetric
- D. R and S are reflexive $\Rightarrow R \cap S$ is reflexive

Answer: A



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88. How many students who like phy now had liking for maths before mock test ?

A. 8

B. 6

C. 10

D. none of these

Answer: C



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89. Total number of students who didn't like phy or chem after Mock test is

A. 20

B. 38

C. 24

D. none of these

Answer: B



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90. In society only three types of news paper TOI,HT or Tel are supplied number of families who read TOI,HT and Tel is 43,6,537, respectively. Given that total number of family in the society is 100 and each family read at least one news paper.

If number of family who read HT only is minimum possible then what is the maximum possible number of family who read TOI and Tel but not HT.

A. 6

B. 8

C. 12

D. none of these

Answer: D



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91. In society only three types of news paper TOI,HT or Tel are supplied number of families who read TOI,HT and Tel is 43,6,537, respectively. Given that total number of family in the society is 100 and each family read at least one news paper.

what is the sum of maximum to minimum number of students who read only Tel?

A. 18

B. 21

C. 32

D. none of these

Answer: D



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92. 4 types of newspaper namely HT, TOI, ET and Hindu are available in a society. Number of readers of newspaper HT, TOI, ET and Hindu is in A.P with common difference 10. Number of readers who read exactly 1 news paper is 80, those who read exactly 2 newspaper is 70, those who read exactly 3 newspaper is 60. 20 families don't read any if these newspaper.

What is the minimum total number of families reading Hindu news paper.

- A. 105
- B. 115
- C. 120
- D. none of these

Answer: B



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93. 4 types of newspaper namely HT, TOI, ET and Hindu are available in a society. Number of readers of newspaper HT, TOI, ET and Hindu is in A.P with common difference 10. Number of readers who read exactly 1 news paper is 80, those who read exactly 2 newspaper is 70, those who read exactly 3 newspaper is 60. 20 families don't read any if these newspaper.

What could be the total number of families in the society?

- A. 220
- B. 225
- C. 235
- D. none of these

Answer: C



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94. If $U = \{1,2,3,4,5,6,7,8,9\}$, $A = \{1,2,3,4\}$, $B = \{2,4,6,8\}$ and $C = \{1,4,5,6\}$

then

Match List -I with List-II

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95. Match the List I with List II and select the correct option.

List I	List II
A Protozoa	<i>Pennatula</i>
B Aschelminthes	<i>Beroe</i>
C Porifera	<i>Monocystis</i>
D Ctenophora	<i>Wuchereria</i>
E Cnidaria	<i>Cliona</i>

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96. An investigator interviewed 100 student to determine their preferences for the three drinks , Milks (M), coffee (C) and Tea (T). He reported the following:10 students had all the three drinks M,C,T, 20 had M and C , 30 had C and T, 12 had M only, 5 had C only and 8 had T only Hence 80/k did not take any of the three drinks ? so find the integral value of k?

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97. Find the sum of the number of smallest and largest set of Y such that

$$Y \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$$

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98. For sets A and B prove the following using the properties of sets : $(A \cup B) - A = B - A$

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99. For sets A and B prove the following using the properties of sets : $A \cup (B - A) = A \cup B$

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100. For sets A and B prove the following using the properties of sets : $A - (A - B) = B \Leftrightarrow B \subseteq A$

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101. For sets A and B prove the following using the properties of sets : $A \cup (A \cap B) = A$

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102. For sets A and B prove the following using the properties of sets : $(A \cap B) \cup (A - B) = A$

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103. For sets A and B prove the following using the properties of sets : $(A \cup B) \cap (A \cup B') = A$

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104. For sets A,B and C prove the following using the properties of sets :

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



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105. For sets A,B and C prove the following using the properties of sets :

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



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106. For sets A,B and C prove the following using the properties of sets :

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



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107. If A and B are two non-empty sets having n elements in common, then show that $A \times B$ and $B \times A$ have n^2 elements in common.

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108. Use logical method to prove the following :

For any set A prove that $(A')' = A$

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109. Use logical method to prove the following :

For any two sets A and B prove that

$$A \subseteq B \Leftrightarrow B' \subseteq A'$$

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110. Use logical method to prove the following :

For any two sets A and B prove that $A - B = \phi$ iff $A \subseteq B$

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111. In a group of 1000 people , 750 can speak Bengali All the people speak Hindi and one of the two languages How many can speak Hindi only? How Many can speak Bengali? How many can speak both hindi and Bengali ?

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112. Shade the following sets :

$A' \cap B'$

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113. Shade the following sets :

$$A' \cup B'$$



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114. Shade the following sets :

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



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115. Shade the following sets :

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



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116. The following three relations are defined on the set of natural numbers \mathbb{N} :

$$R = \{(x, y) : x < y, x \in \mathbb{N}, y \in \mathbb{N}\}$$

$$S = \{(x, y) : x + y = 10, x \in \mathbb{N}, y \in \mathbb{N}\}$$

$$T = \{(x, y) : x = y \text{ or } x - y = 1, x \in \mathbb{N}, y \in \mathbb{N}\}$$

explain which of the above relation are

A. reflexive

B. symmetric

C. transitive

D.

Answer:



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117. Let R be the relation defined on the set of natural numbers N as

$$R = \{(x,y) : x \in N, y \in N, 2x + y = 41\}$$

whether R is

- A. reflexive
- B. symmetric
- C. transitive
- D.

Answer:

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118. A relation R on the set of complex number is defined by $z_1 R z_2$

iff $\frac{z_1 - z_2}{z_1 + z_2}$ is real, show that R is an equivalence relation.

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119. Let A and B be two sets containing four and two elements respectively. Then the number of students of the set $A \times B$ each having at least three elements is

A. 256

B. 275

C. 510

D. 219

Answer: D

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120. Let $S = \{(a,b,c) \in N \times N \times N : a + b + c = 21, a \leq b \leq c\}$
and $T = \{(a, b, c) \in N \times N \times N : a,b,c \text{ are in A.P}\}$ where N is the

set of all natural numbers . Then the numbers of elements in the set $S \cap T$ is

A. 6

B. 7

C. 13

D. 14

Answer: B



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121. A relation ρ on the set of real number R is defined as follows:

$x\rho y$ if and only if $xy > 0$ Then which of the following is /are true?

A. ρ is reflexive and symmetric

B. ρ is symmetric but not reflexive

C. ρ is symmetric and transitive

D. ρ is an equivalence relation

Answer: B::C



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122. If $X = \{4^n - 3n - 1 : n \in N\}$ and $Y = \{9(n - 1) : n \in N\}$ where

N is the set of natural numbers then $X \cup Y$ is equal to

A. X

B. Y

C. N

D. $Y-X$

Answer: B



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123. There is a group of 265 persons who like either singing or dancing or painting .In this group 200 like singing ,10 like dancing and 55 like painting. If 60 persons like both singing and dancing,30 like both singing and painting and 10 like all three activities then the number of persons who like only dancing and painting is

- A. 10
- B. 20
- C. 30
- D. 40

Answer: A

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124. We define a binary relation \sim on the set of all 3×3 real matrices as $A \sim B$ if any there exist invertible matrices P and Q that $B = PAQ^{-1}$. The binary relation \sim is

- A. neither reflexive nor symmetric
- B. reflexive and symmetric but not transitive
- C. symmetric and transitive but not reflexive
- D. an equivalence relation

Answer: D



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125. For any two real number θ and ϕ we define $\theta \phi$ if and only if $\sec^2 \theta - \tan^2 \theta = 1$.the relation R is

- A. reflexive but not transitive

- B. symmetric but not reflexive
- C. both reflexive and symmetric but not transitive
- D. an equivalence relation

Answer: D



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126. Let $X_n = \left\{ z = x + iy : |z|^2 \leq \frac{1}{n} \right\}$ for all integers $n \geq 1$ Then

$\bigcap_{n=1}^{\infty} X_n$ is

- A. a singleton set
- B. not a finite set
- C. an empty set
- D. a finite set with more than one elements

Answer: A



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127. Let A and B be two sets containing 2 and 4 elements respectively. The number of subsets of $A \times B$ having 3 or more elements is

- A. 211
- B. 220
- C. 219
- D. 256

Answer: C



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128. For any two real number a and b ,we define $a R b$ if and only if $\sin^2 a + \cos^2 b = 1$. The relation R is

- A. Reflexive but ot Symmetric
- B. Symmetric but not transitive
- C. Transitive but not Reflexive
- D. an Equivalence relation

Answer: D

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129. Let $X = \{1,2,3,4,5\}$ The number of different ordered pairs (Y,Z) that can be formed such that $Y \subseteq X, Z \subseteq X$

- A. 5^2

B. 3^5

C. 2^5

D. 5^3

Answer: B



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130. There are 100 students in a class . In a examination, 50 of them failed in Mathematics , 45 failed in Physics, 40 failed in Biology and 32 failed in exactly two of the three subjects .Only one student passed in all the subjects .Then the number of students failing in all the three subjects

A. is 12

B. is 4

C. is 2

D. cannot be determined from the given information

Answer: C

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131. Let R be the set of real numbers

Statement-1: $A = \{(x, y) \in R \times R : y-x \text{ is an integer}\}$ is an equivalence relation on R .

Statement -2 : $B = \{(x, y) \in R \times R : x = \alpha y \text{ for some relational number } \alpha\}$

is an equivalence relation on R .

- A. Statement-1 is true ,Statement-2 is true,Statement-2 is not a correct explanation for Statement-1
- B. Statement-1 is true,Statement-2 is false
- C. Statement-1 is false, Statement -2 is true

D. Statement-1 is true, Statement-2 is true, Statement-2 is a correct explanation for Statement-1

Answer: B



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