GROUPS 23 11 23

Thursday, November 23, 2023 7:34 PM

Group : Ring Fields & Advanced Graphs

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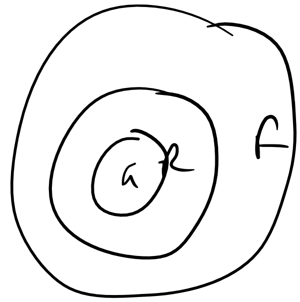


Field is most Structured

G → most Basic Algebraic Structure

R → G + (X)

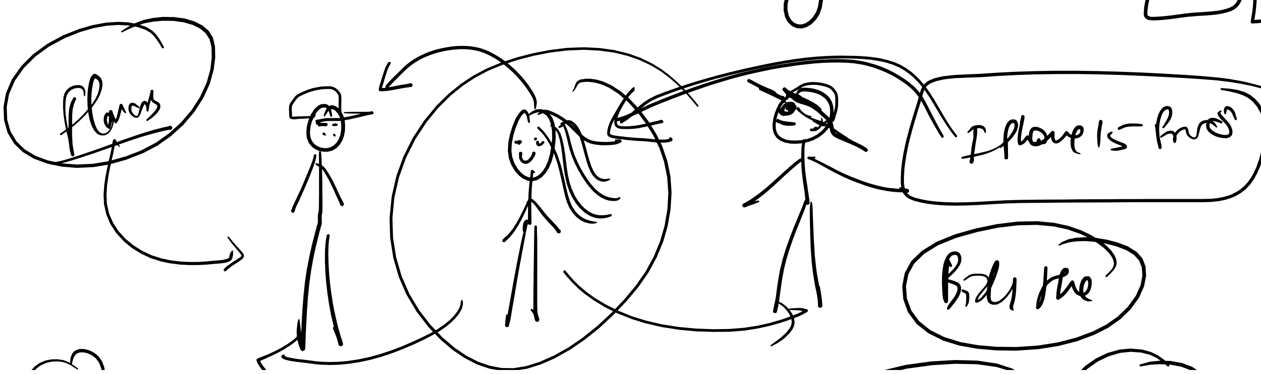
F → R + (Reqmt of X)

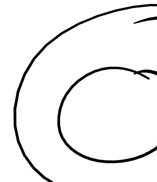
Every Ring is a Group under Addition

Every Field is a Ring

Not all Ring → Field

$\boxed{G}$ $\boxed{R}$ $\boxed{F}$





2 3 4

field → Trust X

y^1 y^2 y^3

y = 100

Neighborhood

0 – 200

field

y, y + 2, y + 4, y + 100

y = 100

y, y^2, y^3, y^4

y = 2 4 8 16

(0 – 3)

y 2y 3y 4y

WI → y

GP → R

PI → θ

A / R

2^2 2^3

n^n

#

group theory (1)

10 years

f → 4f

15 min

Meditation

10/15

8 8:15

8:30 8:45

9:05

2 fish fry

100

11

∞

R|L

Redditeurs

∞

1

2ff

L | R

Equivalence Relation

Reflexive (a, a)

Symmetric (a, b) (b, a)

Transitive (a, b) (b, c) (a, c) is in Relation

Antisymmetric ≠ Asymmetric

$$2^{2n+3} = {}^{2n+3}C_0 + {}^{2n+3}C_1 + \dots + {}^{2n+3}C_n + {}^{2n+3}C_{n+1} + \dots + {}^{2n+3}C_{2n+3}$$

$${}^nC_r = {}^nC_{n-r}$$

$$2^{2n+3} = 2\left({}^{2n+3}C_{n+1} + {}^{2n+3}C_{n+2} + \dots\right)$$

$$2^{2n+3} = 2\alpha$$

$$\alpha = 2^{2n+2}$$

1. Let A be any set containing 2n+3 elements, then the number of subsets having more than n+1 elements are
   (a) 2^{2n} (b) 2^{n-1}
   (c) $2^{2(n+1)}$ (d) 2^{n}

2. Let A and B be any two sets having 11 elements in common, then the number of elements common in AXB and BXA is
   (a) 11 (b) 11^2
   (c) 10 (d) 2^{11}

$|A \cap B| = 11$

$|(A\times B) \cap (B\times A)| = |(A\cap B) \times (B\cap A)| = 11 \times 11 = 121$

3. The Relation defined on the set A= {-3, -2,1,2} by $R = \{(x, y): |x-y| \le 5\}$ is given by
   (a) {(-3,-2),(-3,1),(-3,2),(-2,1)}
   (b) {(-2,1),(-3,-2),(1,2)}
   (c) {(2,2),(1,1),(1,-3),(-2,-3)}
   (d) None of these

Containing all orders

4. Choose the correct statement:
   (a) Every irreflexive relation on a set A is Symmetric.
   (b) Every irreflexive relation on a set A is always anti symmetric
   (c) Empty set on any set is always an equivalence relation
   (d) Every Asymmetric relation is irreflexive.

5. If A is any non-empty set with the cardinality "n" then the number of Asymmetric relation is
   (a) 2^n (b) 3^n
   (c) $3^{(n(n-1))/2}$ (d) 3^{n-1}

6. Let A = {1,2}, then Relation S= {(1,1), (1,2)} is
   (a) Reflexive
   (b) Irreflexive
   (c) Symmetric
   (d) Neither reflexive nor irreflexive

(b) Irreflexive

(c) Symmetric

(d) Neither reflexive nor irreflexive

7. A nonempty relation which is reflexive relation cannot be

(a) Symmetric

(b) Asymmetric

(c) Transitive

(d) None of these

8. If |A|=5, then the number of equivalence relation is

(a) 25 (b) 52

(c) 50 (d) 15

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9. The relation "greater than" on the set of natural number is

(a) Only reflexive (b) Only Symmetric

(c) Only transitive (d) Equivalence relation

10. For real number x and y, we define a relation x R y⇔ x-y +$\sqrt{5}$ is an irrational number .Then the relation R is

(a) Reflexive (b) Symmetric

(c) Transitive (d) Equivalence relation

11. Quotient set of an uncountable set cannot be

(a) Finite (b) Countable

(c) Uncountable (d) None of these

12. Which of the following is an equivalence relation on the set of integers

(a) $mRn \Leftrightarrow mn \geq 0$ (b) $mRn \Leftrightarrow mn > 0$

(c) $mRn \Leftrightarrow |m| = |n|$ (d) $mRn \Leftrightarrow mn \leq 0$

13. Which of the following statement is true?

(a) Intersection of two equivalence relation on a set is again an Equivalence relation.

(b) Inverse of an equivalence relation is not an equivalence relation. R ⊂ $(A \times A)$, R^{-1}= {(y, x): (x, y)∈ R}

(c) Union of two equivalence relation is again an equivalence relation.

(d) None of these

14. Let Z, be the set of integers. Define a R b if and only if "a + b" is a multiple of 5. Then relation is

(a) Reflexive

(b) Symmetric

(c) Transitive

(d) Not an equivalence relation

15. The number of not onto maps from a set A of 5 elements to a set B of 3 elements

(a) 120 (b) 125

(c) 100 (d) 135

16. Let A ={2,3,4,5} and Let R={(2,2),(3,3),(4,4),(5,4)} be a relation on A .Then R is

(a) Reflexive (b) Symmetric

(c) Transitive (d) None of these

5×0 → 0

a+b → a

0+5 = 5+0

1+5 = 5+1

1 Relate to 4

4 Relate 6 but 1 is not Related to 6

maps of A to B → 3^5

No of onto

$5C_1(5-1)^3 - 5C_2(5-2)^3 + 5C_3(5-3)^3 + 5C_4(5-4)^3$

$= 5(64) - 10(27) + 10(8) + 5(1)$

17. Let A be a set contains "15" elements, then the number of subsets of A having exactly "11" elements is

(a) 1100 (b) 1165

(c) 1253 (d) 1365

$^{15}C_{11}$

18. Let A be any set, then the power set of A cannot be

(a) Finite (b) Countably infinite

(c) Uncountable (d) Empty

Power set ≠ Empty

19. Empty relation on an empty set is

(a) Only Reflexive

(b) Only Irreflexive

(c) Neither reflexive not irreflexive

(d) Both reflexive and irreflexive

I A

→ $\boxed{21}$ ←

20. If R is an equivalence relation on A and a, b $\in A$, then which of the following is possible

(a) Cl(a)∩Cl(b) ≠ ∅ but Cl (a) ≠ Cl (b)

(b) Cl(a)∩Cl(b) = ∅

(c) Cl(a)∩Cl(b) = {0}

(d) None of these

21. If there are "m" number of equivalence relation on any set A, then the number of partition of set A is

(a) m^2 (b) $2m$

(c) m (d) 3m

22. Let P be any set and x∈ P ,then Cl(x) with any equivalence relation cannot be

element itself

X always belongs Cl(x)

(a) Empty

(b) (b) Equal to the whole set P

(c) Equal to x

(d) None of these

23. Minimum number of transitive relation on a set whose cardinality is "n" is equal to

Every equivalence relation → Transitive

= Partitions

(a) Number of Reflexive relation always

(b) 5n

(c) n^2

(d) $Number\ of\ partition\ of\ n$

24. Define a relation ∼ on N (Set of natural numbers) as a∼b ⇔ a/b ∈ $Z(set\ of\ integers)$ ∀ a, b ∈ N

(a) Reflexive

(b) Symmetric

(c) Transitive

(d) None of these