9) Let A={1,2,3,4,6}. Let R be the relation on A define by {(a,b):a∈A, b∈A, a divides b}. Range of R is

a. {1,2,3,4,6} b. {1,3,4,6} c. {1,2,3,6} d. Ø

{(1,2), (1,1), (1,3), (1,4), (1,6)
(2,2) (2,4), (2,6) ' ... }
Range = {1, 2, 3, 4, 6}

10) Let A={x,y} and B={1,2}. Find the number of relations from A into B.

a. 16 b. 32 c. 64 d. 128

$2^{mn} = 2^{2.2} = 2^4 = 16$

11) Let A={1,2,3,4}. Let R be the relation on A define by {(a,b):a∈A, b∈A, a<b}. Which of the following is false

a. R is not reflexive b. R is transitive c. R is transitive but not reflexive d. R is equivalence relation

a < a True

a < b, b < c
a < c

a < a
1 < 1

1 < 2
2 < 1

12) The 'Subset' relation on set of sets is

a. A partial ordering b. An equivalence relation
c. Transitive and symmetric only d. Transitive and anti-symmetric only

P(A), ⊆

A ⊆ A
Reflexive

A ⊆ B, B ⊆ A
$\boxed{A = B}$
Anti-sym

A ⊆ B, B ⊆ C
A ⊆ C
Transitive

Q1. Let R = {(a, b)|a and b have common mother tongue } be a relation defined on the S where S is the set of all students of a campus Then

(a)R is not reflexive (b)R is not symmetric (c)R is not transitive (d)R is not antisymmetric

a & a (a,a) ∈ R

(a & b)
Symmetric

aRb and bRa

$\boxed{a = b}$

Q5. Let $R = \{(a, b) \mid ab \geq 0\}$ be a relation which is defined on the set A where A is the set of Integers. Then

(a) R is reflexive (b) R is symmetric (c) R is transitive (d) All of above ✓

$(a,a) \in R \Rightarrow a^2 \geq 0 \quad \forall a \in A$

$(a,b) \in R \quad ab \geq 0$

$ba \geq 0$

$(b,a) \in R$

$(a,b) \in R$ and $(b,c) \in R$

$ab \geq 0$, $bc \geq 0$

Q12. Let R be a relation defined on the set A. Then two elements x and y of a set are said to be incomparable if

(a) xRy or yRx ✗ (b) xRy and yRx ✗ (c) neither xRy nor yRx ✓ (d) None of these

if Comparable elements.

$a, b \in A$ $\quad aRb$ or bRa then we say they are Comparable.

e.g. 3 and 5 under divisibility

$3 \nmid 5 \quad 5 \nmid 3$

$3 \not R 5 \quad 5 \not R 3$

$3 R 6$

$3 R 6$. but $6 \not R 3$.

Q19. If A = {a, b, c} and B = {e, f} then total number of relations from A to B = ?

(a) 2^5 (b) 2^6 (c) 5^5 (d) 2^3

$2^{m \cdot n} = 2^{3 \cdot 2}$

$= 2^6 = \underline{64}$

Q20. The no. of non empty relations from A = {1, 2, 3} to B = {α, β} is

(a) 2^6 (b) 2^3 (c) $2^6 - 1$ (d) $2^5 - 1$

$2^{mn} - 1$ Total no of non-empty Relations.

$\boxed{2^6 - 1}$ φ → empty Relation is also a Relation.

$2^6 - 1$ no. of non-empty Relations.

—×—

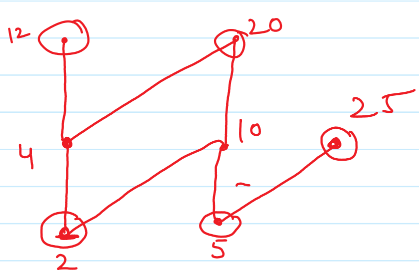
Q25. The minimal elements of the poset ({2, 4, 5, 10, 12, 20, 25}, |) are

(a) 2 and 5 (b) 2, 4, 5 (c) 2 (d) None of these

Q26. Let A = {1, 2, 3, 4}. The relation R whose matrix is $\begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{bmatrix}$ is

A = {1, 2, 3, 4}

A = {1, 2, 3}



12, 20, 25 are Maximal elements

and 2, 5

$$\begin{array}{c|cccc} & 1 & 2 & 3 & 4 \\ \hline 1 & 1 & 0 & 1 & 0 \\ 2 & 0 & 1 & 0 & 1 \\ 3 & 1 & 0 & 0 & 0 \\ 4 & 0 & 0 & 1 & 0 \end{array}$$

a

R = {(1,1), (1,3), (2,2), (2,4), (3,1), (4,3)}

Q25. The minimal elements of the poset ({2, 4, 5, 10, 12, 20, 25}, |) are
(a)2 and 5 (b)2, 4, 5 (c) 2 (d)None of these

Q26. Let A={1 , 2, 3, 4}.The relation R whose matrix is $\begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix}$ is
(a)only symmetric (b)only reflexive (c)only transitive (d)an equivalence relation

Q27. Consider the given relation R , defined on A = {1 , 2 , 3, 4}
R = {(1,1), (1,2), (2,2), (3,4), (4,4)}, then which one of the following is true
(a)R is reflexive (b)R is symmetric (c)R is not reflexive (d)R is transitive

R = { (1,2), (2,1) }

R = { (1,1), (2,2), (3,3), (4,4), (1,3), (3,1), (2,4), (4,2) }

(3,1) (2,4)

(o

(a,a) ∈ R ∀ a ∈ A Reflexive)

(a, b) ∈ R ~~and~~ (b,a) ∈ R Symmetric

(a, b) ∈ R and (b, c) ∈ R ⇒ (a, c) ∈ R Transitive

R = { (1,2), (2,1), (1,3)

R = { (1,2), (2

R = { (1,2), (3,4) }

(a,b), (b,c)

(a,c)

Q29. Let R={(a,b): If a and b born on same day } defined on the A , where A is the set of person living in a same city ,then R is
(a)only reflexive (b)only symmetric (c)only transitive (d)an equivalence relation

R = { (a,b): If a and b born on Same day }

(a, a) (a, b) (a,b) ∈ R (b,c) ∈ R

Q35. Let R={(a,b): If ~~a and b~~ belong to the same section K1500} defined on the A , where A is the set of person ,then R is

(a)only reflexive (b)only symmetric (c)only transitive (d)an equivalence relation ✓

R = {(a, b): If a and b belong to the Same Section K20EN}

K20EN

(a, a) ✓ (a, b) (a, b) ∈ R , (b, c) ∈ R

$n(A\times A) = n(A)\times n(A)$

$= 3\times 3 = 9$ ✓

$2^{n^2} = 2^{3^2} = 2^9$

Q: if $A = \{a, b, c\}$ then $n(A \times A) = ?$

(a) 4 (b) 16 (c) 8 (d) 9

$2^{mn} = 2^{3.3} = 2^9$

Q: if $A = \{a, b, c\}$ then total $number\ of\ relations\ from\ A\ to\ A = ?$

(a) 2^{16} ✓(b) 2^9 (c) 4^4 (d) 4^4

Q: $Consider\ the\ given\ relation\ R\ , defined\ on\ A = \{1, 2, 3, 4\}$
$R = \{(1,1), (1,2), (2,1), (2,2), (3,4), (4,1), (4,4)\}$, $then$ $which\ one\ of\ the\ following\ is\ true$

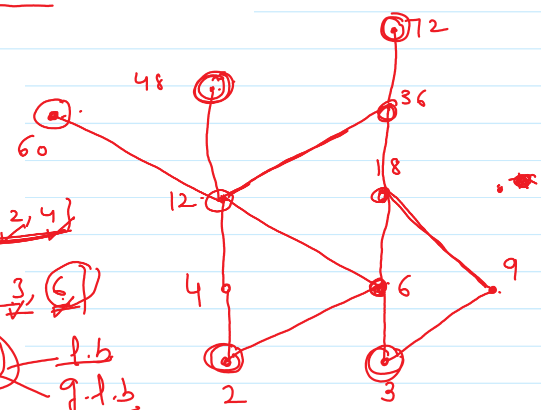
(3,4), (4,1)

(3,1) ∉ R

✗ (a) $R\ is\ reflexive$ ✗ (b) $R\ is\ symmetric$ ✓ (c) $\boxed{R\ is\ not\ transitive}$ (d) $R\ is\ antisymmetric$

Q: Which element of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) is greatest

(a) 48, 60, and 72 (b) 72 and 60 (c) 60 and 72 ✓(d) does not exist



Q: Which element/s of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) is/are Maximal

✓(a) 72, 60and 48 (b) 72, 60 (c) 60, 48 (d) 72, 48

Q: Which element/s of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) is/are minimal

(a) 2 ✓(b) 3, 2 (c) 3 (d) Do not exist

{2, 4}

Q: Which elements of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) are upper bound of {36, 60}

(a) 72, 60and 48 (b) 3, 2 (c) 3 ✓ $\boxed{\text{(d) Do not exist}}$

{3, 6}

Q: Which element/s of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) is/are lower bound of {6, 3}

3 l.b
g.l.b

(a) 2, 3 (b) 6 (c) 3 (d) Do not exist

Q: The Hasse diagram of the $Poset$ ({2,3,4,6, 9, 12 ,18,36,48,60,72}, |) is

(a) A Lattice (b) A bounded lattice ✓(c) Not a Lattice (d) None of these

2 l.b
g.l.b

Q: $Let\ R\ be\ a\ relation\ on\ the\ set\ of\ all\ integers\ defined\ by\ R = \{(a, b) | a < b\}$ Then which one of following is true

2	36 – 60
2	18 – 30
3	9 – 15

(a) $R\ is\ reflexive$ ✗ (b) $R\ is\ symmetric$ ✗ ✓ $\boxed{(c)\ R\ is\ transitive}$ (d) $R\ is\ partial\ order$ ✗

Q: $Let\ R\ be\ a\ relation\ on\ the\ set\ of\ all\ students\ of\ K1420\ defined\ by$
$R = \{(a, b) | a\ and\ b\ are\ from\ same\ state\}$ Then which one of following is true

4 × 9 × 5

(a) R is reflexive (b) R is symmetric (c) R is transitive (d) R is partial order

Q: Let R be a relation on the set of all students of K1420 defined by $R = \{(a, b) | a$ and b are from same state$\}$ Then which one of following is true

(a) R is not reflexive (b) R is not symmetric (c) R is equivalence (d) R is partial order

$\{2, 3, 4, 6, 9, 12, 18, 36, 48, 60, 72\}$

36, 60

$36 = 6 \times 6 = 2 \times 3 \times 2 \times 3 = 2^2 \times 3^2$

$60 = 2 \times 2 \times 3 \times 5$

$= 2^2 \times 3 \times 5$

$H.C.F = g.c.d = 2^2 \times 3 = 12$ g.l.b

$4 \times 9 \times 5$

2	18 – 30
3	9 – 15
3	3 – 5
5	1 – 5
	1

36 3

5

180

$\{36, 60\}$

$\{36, 60\}$

36

(i) Reflexive

(ii) Anti-symmetric

(iii)

$\{36, 60\}$

2, 3, 4, 6, 12

lower bound

lattice. Let A be a non-empty set

$(A, \leq)$ is called Lattice.

if Supremum l.u.b and infimum g.l.b both exist for every pair of elements.

In case of divisibility.

→ g.l.b = H.c.f (a, b)

→ l.u.b = l.c.M (a, b)

if g.l.b and l.u.b both exist for every pair of elements

Then it is called a lattice

$\{\{2, 3, 5\}, |\}$ IS it a lattice.

g.l.b (2, 3) = H.C.F (2, 3) = 1 $\notin \{2, 3, 5\}$

So it is not a Lattice.

$\{\{1, 2, 3, 4\}, |\}$

$\{\{1, 2, 4\}, |\}$

H.c.f (1, 2) = 1, l.c.M (1, 2) = 2

H.c.f (2, 4) = 2, l.c.M (2, 4) = 4.

H.c.f (1, 4) = 1, l.c.M (1, 4) = 4

$\{\{1,2,3,4\}, 1\}$

l.c.m $(3,4) = 12 \notin \{1,2,3,4\}$

It is not a lattice.

Reflexive, AntiSymmetric, transitive — Partial order relation.

$(P(S), \subseteq)$ Then it is a lattice

(i) g.l.b $(A,B) = (A \cap B)$

(ii) l.u.b $(A,B) = (A \cup B)$

$A = \{1,2\}$

$P(A) = \{\phi, \{1\}, \{2\}, \{1,2\}\}$

$\phi \cap \{1\} = \phi$ ✓

$\{1\} \cap \{2\} = \phi$ ✓

$\{2\} \cap \phi = \phi$ ✓

$\{1\} \cap \{1,2\} = \{1\}$ ✓

$\{2\} \cap \{1,2\} = \{2\}$ ✓

$\phi \cup \{1\} = \{1\}$ ✓

$\{1\} \cup \{2\} = \{1,2\}$

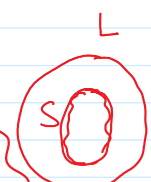
$\{2\} \cup \phi = \{2\}$

$\{1\} \cup \{1,2\} = \{1,2\}$

$\{2\} \cup \{1,2\} = \{1,2\}$

Sub-lattice

Let L be a Lattice and S be a subset of L if S is itself a Lattice then it is called Sub-lattice



$L = \{\{1,2,4\}, 1\}$

$S = \{\{1,2\}, 1\}$

g.l.b $\{1,2\} = 1$ l.u.b $\{1,2\} = 2$

$S \subseteq L$

$\Rightarrow$ S is a Sublattice

Q1) What is

$A = \{1,2,3\}$

$P(A) = \{\phi, \{1\}, \{2\}, \{1,2\}, \{1,3\}, \{2,3\}, \{1,2,3\}\}$

$\{1,2\} \cap \{1,3\} = \{1\}$

$\{1,2\} \cup \{1,3\} = \{1,2,3\}$

$(P(A), \subseteq)$ It is a lattice

$B = \{1,2\}$ $B \subseteq A$

$(P(B), \subseteq)$ It is a lattice

Tower of Honoi Problem. $2^n - 1$

What is the recurrence relation of Tower of Honoi problem.

a_3 3 $2^3 - 1 = 7$

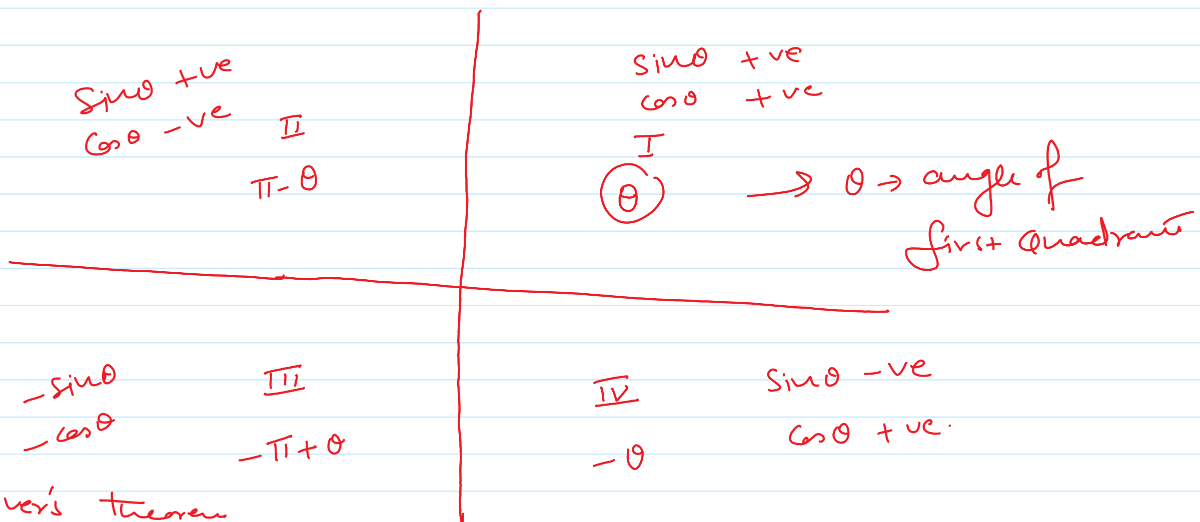
a_4 4 $2^4 - 1 = 15$

a_5 5 $2^5 - 1 = 31$

$a_4 - 2a_3 = 1$ $a_5 - 2a_4 = 1$

$a_n - 2a_{n-1} = 1$

$\boxed{a_n = 2a_{n-1} + 1}$ $\boxed{a_1 = 1}$



De-moiver's theorem

$(\cos\theta + i\sin\theta)^n = (\cos n\theta + i\sin n\theta)$

$a_n + a_{n-1} + a_{n-2} = 0$

$\alpha^2 + \alpha + 1 = 0$

$$\alpha = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} = \frac{-1 \pm \sqrt{1 - 4(1)(1)}}{2} = \frac{-1 \pm \sqrt{-3}}{2}$$

$$= -\frac{1}{2} \pm i\frac{\sqrt{3}}{2}$$

$a_n = c_1 \left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^n + c_2 \left(-\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)^n$

$$= -\frac{1}{2} \pm i\frac{\sqrt{3}}{2}$$

$$a_n = c_1\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^n + c_2\left(-\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)^n$$

$$-\frac{1}{2} + i\frac{\sqrt{3}}{2} = r(\cos\theta + i\sin\theta)$$

$$r\cos\theta = -\frac{1}{2} \rightarrow (1)$$

$$r\sin\theta = \frac{\sqrt{3}}{2} \rightarrow (2)$$

Sq and adding (1) & (2)

$$r^2 = \frac{1}{4} + \frac{3}{4}$$

$$r^2 = 1$$

$$\boxed{r = 1}$$

$$\cos\theta = -\frac{1}{2}, \quad \sin\theta = \frac{\sqrt{3}}{2}$$

$$\theta = \pi - \left(\frac{\pi}{3}\right)$$

$$= \frac{3\pi - \pi}{3} = \frac{2\pi}{3}$$

$$-\frac{1}{2} + i\frac{\sqrt{3}}{2} = \left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)$$

$$\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^n = \left(\cos\frac{2\pi}{3} + i\sin\frac{2\pi}{3}\right)^n$$

$$\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^n = \cos\frac{2n\pi}{3} + i\sin\frac{2n\pi}{3}$$

$$\left(-\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)^n = \cos\frac{2n\pi}{3} - i\sin\frac{2n\pi}{3}$$

$$a_n = c_1\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)^n + c_2\left(-\frac{1}{2} - i\frac{\sqrt{3}}{2}\right)^n$$

$$= c_1\left(\cos\frac{2n\pi}{3} + i\sin\frac{2n\pi}{3}\right) + c_2\left(\cos\frac{2n\pi}{3} - i\sin\frac{2n\pi}{3}\right)$$

$$= (c_1 + c_2)\cos\frac{2n\pi}{3} + (ic_1 - ic_2)\sin\frac{2n\pi}{3}$$

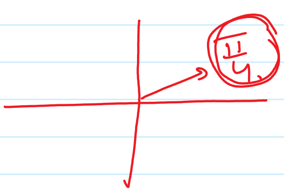
$$= \left(A\cos\frac{2n\pi}{3} + B\sin\frac{2n\pi}{3}\right)$$

$$r^n\left(A\cos n\theta + B\sin n\theta\right)$$

$$\rightarrow \boxed{c_1(1+i)^n + c_2(1-i)^n}$$

$$\rightarrow r^n\left[A\cos n\theta + B\sin n\theta\right]$$

$$(\sqrt{2})^n\left[A\cos\frac{n\pi}{4} + B\sin\frac{n\pi}{4}\right]$$



$$1+i = r(\cos\theta + i\sin\theta)$$

$$r\cos\theta = 1 \rightarrow (1)$$

$$r\sin\theta = 1 \rightarrow (2)$$

$$r^2 = (1)^2 + (1)^2$$

$$r^2 = 1+1$$

$$\boxed{r = \sqrt{2}}$$

$$\cos\theta = \frac{1}{\sqrt{2}}, \quad \sin\theta = \frac{1}{\sqrt{2}}$$

$$1+i = r(\cos\theta + i\sin\theta)$$

$$r\cos\theta = 1 \rightarrow (1)$$

$$r\sin\theta = 1 \rightarrow (2)$$

$$r^2 = (1)^2 + (1)^2$$

$$r^2 = 2$$

$$\boxed{r = \sqrt{2}}$$

$$\cos\theta = \frac{1}{\sqrt{2}}, \quad \sin\theta = \frac{1}{\sqrt{2}}$$

M_{R^2}

R^2

$$M_R = \begin{array}{c|ccc} & 1 & 2 & 3 \\ \hline 1 & 0 & 1 & 1 \\ 2 & 1 & 1 & 0 \\ 3 & 1 & 0 & 1 \end{array}$$

$R = \{ (1,2), (1,3), (2,1), (2,2), (3,1), (3,3) \}$

$R \circ R = \{ \quad \}$

R		R	
1 — 2		1	2
1 — 3		1	3
2 — 1		2 — 1	
2 — 2		2 — 2	
3 — 1		3 — 1	
3 — 3		3	3

$R \circ R = \{ (1,1), (1,2), (1,3), (2,2), (2,3), (2,1), (3,2), (3,3), (3,1) \}$

$$M_{R^2} = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

Q Δe^{6x}

$\Delta f(x) = f(x+h) - f(x)$ $\qquad h = 1$

$= e^{6(x+h)} - e^{6x}$

$= e^{6x}(e^{6h} - 1) = e^{6x}(e^{6} - 1)$

(a) $e^{6x}(e^{6h} - 1)$ (b) $e^{6x}(e^{xh} - 1)$

(c) $e^{6x}(e^{6} - 1)$ (d) $e^{6x}(e^{x} - 1)$

Q

The value of $\Delta[\log x]$

(a) $\log(1+h/x)$

(b) $\log(1+1/x)$

(c) $\log(x+x/h)$

(d) $\log(x+h/x)$

$\Delta f(x) = f(x+h) - f(x)$

$= \log(x+h) - \log x$

$= \log\left(\frac{x+h}{x}\right)$

$= \log(1+h/x)$

$x \to (x+5h)$

Q $E^{5}(3x-2)$

(a) $5(x+5h)-2$

(b) $3(x+5h)-2$

(c) $5(x+5h)-2$

(c) $2(x+2h)-2$

$3(x+5h)-2$

$R = \{(1,2), (2,3), (3,1)\}$

$R^{-1} = \{(2,1), (3,2), (1,3)\}$

→ $R_1 - R_2$

→ $R_1 \cup R_2$

→ $R_2 - R_1$

$$G(a,z) = \frac{z}{1-7z+10z^2}$$

$$= \frac{z}{1-5z-2z+10z^2}$$

$1-2z=0$

$z=1/2$

$$= \frac{z}{(1-5z)-2z(1-5z)}$$

$1-5z=0$

$z=1/5$

$$= \frac{z}{(1-2z)(1-5z)}$$

$$= \frac{1/2}{(1-2z)(1-5/2)} + \frac{1/5}{(1-2/5)(1-5z)}$$

$$= \frac{1/2}{(\frac{-3}{2})(1-2z)} + \frac{1/5}{3/5(1-5z)}$$

$$= -\frac{1}{3}\frac{1}{1-2z} + \frac{1}{3}\frac{1}{1-5z}$$

$$= -\frac{1}{3}(2)^n + \frac{1}{3}(5)^n.$$

$G(a,z) = \frac{1}{1-az}$ $\quad a_n = (a)^n$

Q

$$a_n = 3^n + 5^n$$

$$G(a,z) = \frac{1}{(1-3z)} + \frac{1}{(1-5z)}$$

$$= \frac{1-5z+1-3z}{(1-3z)(1-5z)} = \frac{2-8z}{(1-3z)(1-5z)}$$

$$= \frac{2(1-4z)}{(1-3z)(1-5z)} \quad \text{Ans}$$

1, 7, 31, 127, 499 $\quad$ (b_{n-1}, b_n)

(1) $b_{n+1} = 5\,b_{n-1} + 3$

$= 5(1)+3 = 8.$

(2) $b_{n+1} = 5\,b_{n-1} + 7$

$5(1)+7 = 12$

$= 5+7 = 12$

(3) $b_n = 4\,b_{n-1} + 3$

$= 4+3$

$= 7$

(4) $b_n = b_{n-1} + 1.$

$- \checkmark$

$0 \cdot x +$ $\qquad$ $4 + 1 \cdot x$

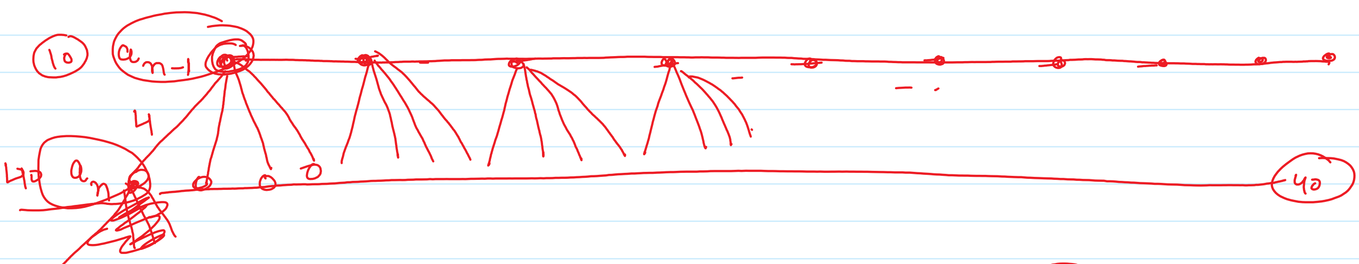
Q $\quad 4 + 15x^2 + 10x^3 + 25x^5 + 16x^6 + \cdots \infty$

(a) $\times$ $\cancel{10}$, 4, 0, 16, 25 $\qquad$ $a_0 + a_1 x + a_2 x^2 + a_3 x^3 + a_4 x^4 + \cdots$

(b) $\times$ $\cancel{0}$, 4, 15, 10, 16, 25

$\boxed{(c)}$ $\checkmark$ 4, 1, 15, 10, 0, 25, 16

(d) 4, $\cancel{10}$, 15, 25



$a_n = 40$, $\qquad a_{n-1} = 10$

$a_n = 4 \times 10$

$$\boxed{a_n = 4\, a_{n-1}}$$

$a_k = a^k \rightarrow G(a,z)\ \frac{1}{1-az}$

$G(a,z) = \sum_{k=0}^{\infty} a_n z^k$

$= \sum$

Q $\quad a_{n+2} - 5a_{n+1} + 6a_n = 0, \quad a_0 = 1, \; a_1 = 1$

(a) $\frac{x-4}{\ldots}$ $\qquad$ (b) $\frac{1}{1-5x+6x^2}$ $\qquad$ (c) $\frac{1}{\ldots}$

ⓐ $\frac{x-4}{1-5x+6}$ ⓑ $\frac{1}{1-5x+6x^2}$ ⓒ $\frac{1}{1-5x+6}$

ⓓ $\frac{1-4x}{1-5x+6x^2}$

$$\frac{1}{1-3z-2z+6z^2}$$

$$= \frac{1}{(1-3z)-2z(1-3z)}$$

$$= \frac{1}{(1-2z)(1-3z)} = \frac{1}{(1-2z)(1-\frac{3}{2})} + \frac{1}{(1-\frac{2}{3})(1-3z)}$$

$a_0 = 1$, $a_1 = 1$

$$= \frac{1}{(1-2z)(-\frac{1}{2})} + \frac{1}{(\frac{1}{3})(1-3z)}$$

$$G(a,z) = \frac{-2}{1-2z} + \frac{3}{1-3z}$$

$$a_n = -2(2)^n + 3(3)^n.$$

$a_0 = -2+3 = 1$ $a_1 = -4+9 = 5$

$\frac{1}{\varphi(E)} a^n$

$\frac{1}{\varphi(a)} a^n$

$a_n = 6a_{n-1} + 10^n.$

$a_n - 6a_{n-1} = 10^n$

$E(a_n - 6a_{n-1}) = E(10^n)$

$a_{n+1} - 6a_n = 10^{n+1}$

$Ea_n - 6a_n = 10^{n+1}$

$(E-6)a_n = 10^{n+1}$

$E - 6 = 0$

$E = 6$

$a_n^{(h)} = C_1(6)^n$

$$a_n^{(p)} = \frac{1}{(E-6)} 10^{n+1}$$

$$= \frac{1}{10-6} 10^{n+1}$$

$$= \frac{10}{4}(10^n)$$

$$= \frac{5}{2}(10)^n$$

$$\boxed{C_1(6)^n + \frac{5}{2}(10)^n}$$

10, 10, 10, 10, ...

$G(a,z) = \frac{10}{1-z}$

$G(a,z) = \frac{\text{Constant}}{1-z}$

10, 10, 10, 10, ...

$G(a,z) = \frac{10}{1-z}$ $\qquad$ $G(a,z) = \frac{\text{Constant}}{1-z}$

Q $\quad y_{k+2} + 8y_{k+1} + 15y_k = \frac{1}{101}$

(a) $\frac{8}{2424}$ $\quad$ (b) $\frac{15}{2424}$ $\quad$ (c) $\frac{24}{2424}$ $\quad$ (d) $\frac{1}{2424}$

$P.S = \frac{1}{E^2+8E+15}$ $\quad \frac{1}{101}$ $\quad a^n$

$= \frac{1}{(1)+8+15}$ $\quad \frac{1}{101}$

$= \frac{1}{24} \times \frac{1}{101} = \frac{1}{2424}.$

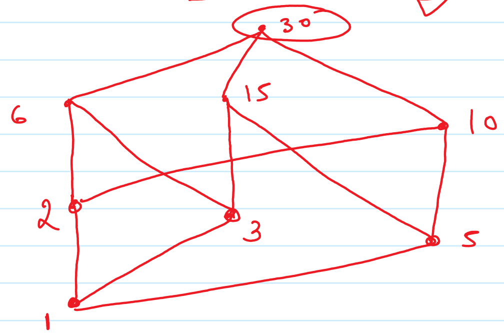
$a_n = 2a_{n-1} + 1$

$a_n - 2a_{n-1} = 1$

linear - non-Homogeneous

$(D_{30}, /)$ $\qquad D_{30} \rightarrow$ Divisiors of 30.

1, 2, 3, 5, 6, 10, 15, 30



Maximal element = 30

Minimal ~~element~~ = 1

greatest element = 30

least element = 1

— x —

$A = \{1, 2, 3\}$

$R_1 = \{(1,1), (2,2), (3,3), (1,2)\}$

$R_2 = \{(1,1), (2,2), (3,3), (3,1)\}$

$R_1 \cap R_2 = \{(1,1), (2,2), (3,3)\}$ $\quad$ reflexive