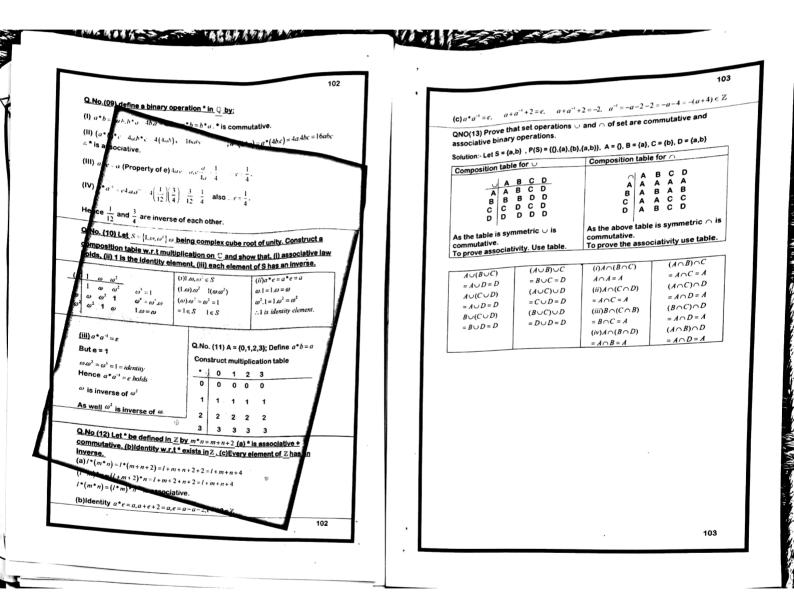
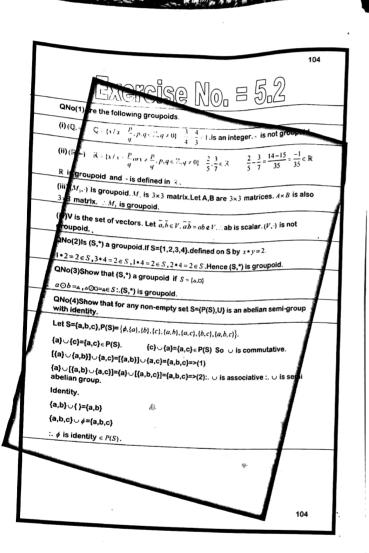


101 Q.No.(04) Let S={A,B,C,D},A={a},B={a,b},C={a,b,c},D=\$.Construct multiplication table to show that \cup and \cap are binary operation on S ABCD UABCD AAAAD AABCA BABBD ввсв CABBD CCCCC DDDD DABCD ∩ is binary operation on S. \cup is binary operation on S. Q.No. (06) On R. Define a binary operation $a \odot b = |a-b| \forall a,b \in R$. Show that \odot is commutative but not associative. $a \odot b = |a-b|, b \odot a = |b-a| = |-a(a-b)| = |a-b| \therefore a \odot b = b \odot a . \bigcirc$ is commutative. Let $a,b,c \in R = |a-b| \odot c = (a \odot b) \odot c$ $(a \odot b) \odot c = ||a-b| - c| \rightarrow (1)$ $(a \odot b) \odot c = a \odot |b - c| = |a - b|b - c| \longrightarrow (2) (1) \neq (2) \therefore (a \odot b) \odot c \neq a \odot (b \odot c)$ Q.No. (07) The binary operation \odot on R is defined by $a \odot b = \max(a,b)$. Verify \odot is both associative and commutative in R. If a > b $a \odot b = a$, $b \odot a = a$ If a < b $a \odot b = b$, $b \odot a = b$: $b \odot a = b$: \odot is commutative. If a < b < c $(a \odot b) \odot c = b \odot c = \odot$ $a \odot (b \odot c) = a \odot c = c$ lfa>b>c (a⊙b)⊙c=a⊙c=a a ⊙ (b ⊙ c) = a ⊙ b =a :. ⊙ is associative in R. QNo. 08 (i) $a \odot b = \sqrt{a^2 + b^2} \quad \forall a, b \in \mathbb{R}$ (ii) $a \odot b = \max(a, b), \forall a, b \in \mathbb{R}$. Find identity element. (i) Property of identity is a*e = a if e = 0 $a \odot 0 = \sqrt{a^2 + 0^2} = \sqrt{a^2} = a$ (ii) $a \odot b = \max(a,b)$, a*e = a (property of e) If a > e a*e = a but if a < e, a*e = e· 'F' does not exist. 101





QNo(5)Show that $(M_1, +)$ is commutative semi-group with identity. M_1 is set of all 3×3 matrices. Then A+(B+C) is 3×3 matrix, also (A+B)+C is 3×3 matrix. + is associative. $A+B=B+A\in M_1,\ A_1+I_2=A_1$ Hence $(M_1, +)$ is commutative semi-group with identity.

(ii) (M_2, \times) is semi-group with identity.

Let $A,B,C\in M_3$ $(A\times B)\times C\in M_3$ also $A\times (B\times C)\in M_3$ $A_1I_3=A_3$ (M_3, \times) is semi-group with identity.

