

Operations on Sets

Name _____

Group _____

1. Given the table, answer the following.

(If you don't want to draw these shapes in your answers, you can refer to them by name.)

♠: spade ♥: heart

♣: club ♦: diamond

@	♠	♣	♥	♦
♠	♦	♥	♠	♦
♣	♥	♦	♣	♠
♥	♠	♣	♥	♦
♦	♣	♠	♦	♥

a. Sally notices that $\spadesuit @ \clubsuit = \clubsuit @ \spadesuit = \heartsuit$ and therefore concludes that @ is commutative.

i. Is her conclusion correct that @ is commutative?

Circle one: Yes or No.

ii. If she is not correct, explain.

b. i. What is $(\spadesuit @ \clubsuit) @ \clubsuit$? Circle the correct choice: ♠ ♣ ♥ ♦

ii. What is $\spadesuit @ (\clubsuit @ \clubsuit)$? Circle the correct choice: ♠ ♣ ♥ ♦

iii. Is @ associative? Circle one: Yes or No.

c. i. Does the operation @ have an identity element? Circle one: Yes or No.

ii. If Yes, what is the identity element? Circle the correct choice: ♠ ♣ ♥ ♦

d. i. What is the inverse of ♠? Circle the correct choice: ♠ ♣ ♥ ♦ No inverse

ii. What is the inverse of ♣? Circle the correct choice: ♠ ♣ ♥ ♦ No inverse

iii. What is the inverse of ♥? Circle the correct choice: ♠ ♣ ♥ ♦ No inverse

iv. What is the inverse of ♦? Circle the correct choice: ♠ ♣ ♥ ♦ No inverse

2. Given the table, answer the following.

a. i. Is the operation & commutative? Circle one: Yes or No.

ii. If No, explain.

&	□	△	○
□	□	△	□
△	△	○	△
○	□	△	○

b. i. Does the operation & have an identity element? Circle one: Yes or No.

ii. If Yes, what is the identity element? Circle one: □ △ ○

c. i. Does every element in the set have an inverse? Circle one: Yes or No.

ii. If no, circle one element that does **not** have an inverse. Circle one: □ △ ○

3. Which property is being used in each?

Pick the best choice from the list A through I.

a. $3 \times (2 \times 7 + 1) = 3 \times (7 \times 2 + 1)$ _____

b. $18 + (43 \times 7) \times 9 = 18 + 43 \times (7 \times 9)$ _____

c. $(12 + 17) \times (16 + 5) = (12 + 17) \times 16 + (12 + 17) \times 5$

- A. commutative property of addition.
- B. associative property of addition.
- C. additive identity property.
- D. additive inverse property.
- E. commutative property of multiplication.
- F. associative property of multiplication.
- G. multiplicative identity property.
- H. multiplicative inverse property.
- I. distributive property for multiplication over addition.