Axioms of Addition and Multiplication over $\Re$

$a,b,c \in \Re$; a,b,c are Real Numbers

$a+b$ is a unique real number. Ex. The sum of any two real numbers only gives one real answer.	**Closure Axiom for Addition**
$(a+b)+c=a+(b+c)$ Ex. $(2+3)+4=2+(3+4)$	**Associative Axiom for Addition**
$a+b=b+a$	**Commutative Axiom for Addition**
There exists an element $0\in\Re$ such that for each a $\in\Re$, $0+a=a$ and $a+0=a$. Ex. $4+0=4,\ 0+4=4$	**Identity Axiom for Addition**
There exists an element $-a\in\Re$ for each $a\in\Re$, such that $a+(-a)=0$ and $-a+a=0$. Ex. Every real number has an opposite that when added, 0 is the answer. $4+(-4)=0$	**Axiom of Additive Inverses**
ab is a unique real number. Ex. The product of any two real number only gives one real answer.	**Closure Axiom for Multiplication**
$(ab)c=a(bc)$ Ex. $(2\cdot3)\cdot4=2\cdot(3\cdot4)$	**Associative Axiom for Multiplication**
$ab=ba$ Ex. $2\cdot3=3\cdot2$	**Commutative Axiom for Multiplication**
There exists an element $1\in\Re$ such that for each a $\in\Re$, $1\cdot a=a$ and $a\cdot1=a$. Ex. $4\cdot1=4,\ 1\cdot4=4$	**Identity Axiom for Multiplication**
There exists an element $\frac{1}{a}\in\Re$ for each nonzero $a\in\Re$, such that $a\cdot\frac{1}{a}=1$ and $\frac{1}{a}\cdot a=1$. Ex. Every nonzero real number has a reciprocal that when multiplied, 1 is the answer. $\frac{4}{1}\cdot\frac{1}{4}=1$	**Axiom for Multiplicative Inverses**
$a(b+c)=ab+ac$ and $(b+c)a=ba+ca$ Ex. $2(3+4)=2\cdot3+2\cdot4$ and $(3+4)2=3\cdot2+4\cdot2$	**Distributive Axiom**

Axioms of Equality for $\Re$

$a,b,c \in \Re$; a,b,c are Real Numbers

$a=a$	**Reflexive Property**
If $a=b$, then $b=a$.	**Symmetric Property**
If $a=b$ and $b=c$, then $a=c$.	**Transitive Property**

Use the following tables to answer the given questions: Justify each answer.

σ	0	2	4	6
0	4	0	6	4
2	0	2	8	6
4	6	4	2	0
6	2	6	0	4

λ	0	2	4	6
0	4	0	6	2
2	0	2	4	6
4	6	4	2	0
6	2	6	0	4

Is σ closed?

Is λ closed?

Is σ commutative?

Is λ commutative?

Is σ associative?

Is λ associative?

Do inverse elements exist for each element $\{0,2,4,6\}$ under the operation of σ ?

Do inverse elements exist for each element $\{0,2,4,6\}$ under the operation of λ ?

Does an identity element exist under the binary operation σ ?

Does an identity element exist under the binary operation λ ?