A.REI.A.1: Binary Operations

1 The operation element @ is determined by the following table:

@	a	b	c
a	a	b	c
b	b	c	a
c	c	a	b

What is the identity element of this operation?
1) a, only
2) b, only
3) c
4) a and b

2 What is the identity element for ♣ in the accompanying table?

♣	r	s	t	u
r	t	r	u	s
s	r	s	t	u
t	u	t	s	r
u	s	u	r	t

1) r
2) s
3) t
4) u

3 An addition table for a subset of real numbers is shown below. Which number is the identity element? Explain your answer.

+	0	1	2	3
0	0	1	2	3
1	1	2	3	4
2	2	3	4	0
3	3	4	0	1

4 The operation $*$ for the set $\{p,r,s,v\}$ is defined in the accompanying table. What is the inverse element of r under the operation $*$?

$*$	p	r	s	v
p	s	v	p	r
r	v	p	r	s
s	p	r	s	v
v	r	s	v	p

1) p
2) r
3) s
4) v

5 In the addition table for a subset of real numbers shown below, which number is the inverse of 3? Explain your answer.

⊕	1	2	3	4
1	2	3	4	1
2	3	4	1	2
3	4	1	2	3
4	1	2	3	4

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Answer Section

1 ANS: 1
The identity element is *a*, because any element @ *a* equals the original element.

REF: 080112a

2 ANS: 2
The identity element is *s* because any element ♣ *s* equals the original element.

REF: 080514a

3 ANS:
The identity element is 0, because any element + 0 equals the original element.

REF: 060224a

4 ANS: 4
The identity element is *s* because any element $*s$ equals the original element. Then review the table to solve: $r*\_=s$. The inverse of *r* is *v* because $r*v=s$.

REF: 080010a

5 ANS:
The identity element is 4 because any element $\oplus 4$ equals the original element. Then review the table to solve: $3\oplus\_=4$. The inverse of 3 is 1, because $3\oplus 1=4$.

REF: 080222a