RD Sharma
Solutions
Class 12 Maths
Chapter 3
Ex 3.3

Binary Operations Ex 3.3 Q1

and is given by, a*b=a+b for all $a,b\in I^+$

The binary operator * is defined on I^+

Let
$$a \in I^+$$
 and $e \in I^+$ be the identity element with respect to $*$.

by identity property, we have, a * e = e * a = a

⇒ a+e=a ⇒ e=0

Binary Operations Ex 3.3 Q2

Let
$$R - \{-1\}$$
 be the set and $*$ be a binary operator, given by

a * b = a + b + ab for all $a, b \in R - \{-1\}$

Now.

Let $a \in R - \{-1\}$ and $e \in R - \{-1\}$ be the identity element with respect to *.

Binary Operations Ex 3.3 Q3

$$\Rightarrow a + e + ae = a$$

$$\Rightarrow e(1 + a) = 0$$

$$\Rightarrow e(1+a) = 0$$

$$\Rightarrow e = 0$$

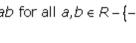
$$\Rightarrow \qquad a+e+$$

$$\Rightarrow \qquad a(1+e)$$

 \Rightarrow

Let
$$a \in R - \{-1\}$$
 and $e \in R - \{-1\}$ be the by identity property, we have,

The required identity element is 0.



 $[\because 1+a \neq 0 \text{ as } a \neq -1]$





We are given the binary operator * defined on Z as a*b=a+b-5 for all $a,b\in Q$.

Let e be the identity element with respect to *

Then,
$$a*e=e*a=a$$
 [By identity property]

$$\Rightarrow e=5$$

Hence, the required identity element with respect to \ast is 5.

Binary Operations Ex 3.3 Q4

 $\Rightarrow a+e-5=a$

The binary operator * is defined on Z, and is given by a*b=a+b+2 for all $a,b\in Z$.

Let
$$a \in Z$$
 and $e \in Z$ be the identity element with respect to *, then
$$a*e=e*a=a \qquad \qquad \text{[By identity property]}$$

$$\Rightarrow a+e+2=a$$

$$\Rightarrow e=-2 \in Z$$