EXERCISE 1.1 PAGE NO: 14

1. Using appropriate properties, find:

(i) -2/3 × 3/5 + 5/2 – 3/5 × 1/6

Solution:

-2/3 × 3/5 + 5/2 – 3/5 × 1/6

= -2/3 × 3/5– 3/5 × 1/6+ 5/2 (by commutativity)

= 3/5 (-2/3 – 1/6)+ 5/2

= 3/5 ((- 4 – 1)/6)+ 5/2

= 3/5 ((–5)/6)+ 5/2 (by distributivity)

= – 15 /30 + 5/2

= – 1 /2 + 5/2

= 4/2

= 2

(ii) 2/5 × (- 3/7) – 1/6 × 3/2 + 1/14 × 2/5

Solution:

2/5 × (- 3/7) – 1/6 × 3/2 + 1/14 × 2/5

= 2/5 × (- 3/7) + 1/14 × 2/5 – (1/6 × 3/2) (by commutativity)

= 2/5 × (- 3/7 + 1/14) – 3/12

= 2/5 × ((- 6 + 1)/14) – 3/12

= 2/5 × ((- 5)/14)) – 1/4

= (-10/70) – 1/4

= – 1/7 – 1/4

= (– 4– 7)/28

= – 11/28

2. Write the additive inverse of each of the following:

Solution:

(i) 2/8

The Additive inverse of 2/8 is – 2/8

(ii) -5/9

The additive inverse of -5/9 is 5/9

(iii) -6/-5 = 6/5

The additive inverse of 6/5 is -6/5

(iv) 2/-9 = -2/9

The additive inverse of -2/9 is 2/9

(v) 19/-16 = -19/16

The additive inverse of -19/16 is 19/16

3. Verify that: -(-x) = x for:

(i) x = 11/15

(ii) x = -13/17

Solution:

(i) x = 11/15

We have, x = 11/15

The additive inverse of x is – x (as x + (-x) = 0).

Then, the additive inverse of 11/15 is – 11/15 (as 11/15 + (-11/15) = 0).

The same equality, 11/15 + (-11/15) = 0, shows that the additive inverse of -11/15 is 11/15.

Or, – (-11/15) = 11/15

i.e., -(-x) = x

(ii) -13/17

We have, x = -13/17

The additive inverse of x is – x (as x + (-x) = 0).

Then, the additive inverse of -13/17 is 13/17 (as 13/17 + (-13/17) = 0).

The same equality (-13/17 + 13/17) = 0, shows that the additive inverse of 13/17 is -13/17.

Or, – (13/17) = -13/17,

i.e., -(-x) = x

4. Find the multiplicative inverse of the following:

(i) -13 (ii) -13/19 (iii) 1/5 (iv) -5/8 × (-3/7) (v) -1 × (-2/5) (vi) -1

Solution:

(i) -13

Multiplicative inverse of -13 is -1/13.

(ii) -13/19

Multiplicative inverse of -13/19 is -19/13.

(iii) 1/5

Multiplicative inverse of 1/5 is 5.

(iv) -5/8 × (-3/7) = 15/56

Multiplicative inverse of 15/56 is 56/15.

(v) -1 × (-2/5) = 2/5

Multiplicative inverse of 2/5 is 5/2.

(vi) -1

Multiplicative inverse of -1 is -1.

5. Name the property under multiplication used in each of the following:

(i) -4/5 × 1 = 1 × (-4/5) = -4/5

(ii) -13/17 × (-2/7) = -2/7 × (-13/17)

(iii) -19/29 × 29/-19 = 1

Solution:

(i) -4/5 × 1 = 1 × (-4/5) = -4/5

Here 1 is the multiplicative identity.

(ii) -13/17 × (-2/7) = -2/7 × (-13/17)

The property of commutativity is used in the equation.

(iii) -19/29 × 29/-19 = 1

The multiplicative inverse is the property used in this equation.

6. Multiply 6/13 by the reciprocal of -7/16.

Solution:

Reciprocal of -7/16 = 16/-7 = -16/7

According to the question,

6/13 × (Reciprocal of -7/16)

6/13 × (-16/7) = -96/91

7. Tell what property allows you to compute 1/3 × (6 × 4/3) as (1/3 × 6) × 4/3.

Solution:

1/3 × (6 × 4/3) = (1/3 × 6) × 4/3

Here, the way in which factors are grouped in a multiplication problem supposedly does not change the product. Hence, the Associativity Property is used here.

8. Is 8/9 the multiplication inverse of $-1\frac{1}{8}$? Why or why not?

Solution:

$-1\frac{1}{8}$ = -9/8

[Multiplicative inverse ⟹ product should be 1]
According to the question,

8/9 × (-9/8) = -1 ≠ 1

Therefore, 8/9 is not the multiplicative inverse of $-1\frac{1}{8}$.

9. If 0.3 is the multiplicative inverse of $3\frac{1}{3}$? Why or why not?

Solution:

$3\frac{1}{3}$ = 10/3

0.3 = 3/10

[Multiplicative inverse ⟹ product should be 1]
According to the question,

3/10 × 10/3 = 1

Therefore, 0.3 is the multiplicative inverse of $3\frac{1}{3}$.

10. Write:

(i) The rational number that does not have a reciprocal.

(ii) The rational numbers that are equal to their reciprocals.

(iii) The rational number that is equal to its negative.

Solution:

(I) The rational number that does not have a reciprocal is 0.

Reason:

0 = 0/1

Reciprocal of 0 = 1/0, which is not defined.

(ii) The rational numbers that are equal to their reciprocals are 1 and -1.

Reason:

1 = 1/1

Reciprocal of 1 = 1/1 = 1, similarly, reciprocal of -1 = – 1

(iii) The rational number that is equal to its negative is 0.

Reason:

Negative of 0=-0=0

11. Fill in the blanks.

(i) Zero has _____reciprocal.

(ii) The numbers _____and _____are their own reciprocals

(iii) The reciprocal of – 5 is _____.

(iv) Reciprocal of 1/x, where x ≠ 0 is _____.

(v) The product of two rational numbers is always a _____.

(vi) The reciprocal of a positive rational number is _____.

Solution:

(i) Zero has no reciprocal.

(ii) The numbers -1 and 1 are their own reciprocals

(iii) The reciprocal of – 5 is -1/5.

(iv) Reciprocal of 1/x, where $x \neq 0$ is x.

(v) The product of two rational numbers is always a rational number.

(vi) The reciprocal of a positive rational number is positive.