Exercise 1.1   Page: 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
Additive inverse of 2/8 is – 2/8
(ii) -5/9
Additive inverse of -5/9 is 5/9
(iii) -6/-5 = 6/5
Additive inverse of 6/5 is -6/5
(iv) 2/-9 = -2/9
Additive inverse of -2/9 is 2/9
(v) 19/-16 = -19/16
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 11/15 + (-11/15) = 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

(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

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 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 <u>no</u> reciprocal.
(ii) The numbers <u>-1</u> and <u>1</u> are their own reciprocals
(iii) The reciprocal of – 5 is <u>-1/5</u>.
(iv) Reciprocal of 1/x, where x ≠ 0 is <u>x</u>.
(v) The product of two rational numbers is always a <u>rational number</u>.
(vi) The reciprocal of a positive rational number is <u>positive</u>.