STD 8 Maths **Total Marks : 30**

Rational Numbers DPP-6

*** Choose The Right Answer From The Given Options.[1 Marks Each]** **[10]**

1. A number which can be written in the form, $\frac{p}{q}$ where p and q are integers and _____ is called a rational number.

   (A) q = 0 (B) q ≠ 0 (C) q = 1 (D) None of these

   Ans. :

   b. q ≠ 0

2. a(b + c) = ab + ac is called:

   (A) Commutative law (B) Associative law (C) Distributive law (D) None of these

   Ans. :

   c. Distributive law

3. The additive inverse of $\frac{2}{3}$ is:

   (A) $-\frac{2}{3}$ (B) $\frac{2}{3}$ (C) $-\frac{3}{2}$ (D) 1

   Ans. :

   a. $-\frac{2}{3}$

4. Tick (✓) the correct answer the following:

   Additive inverse of $\frac{-5}{9}$ is:

   (A) $\frac{-9}{5}$ (B) 0 (C) $\frac{5}{9}$ (D) $\frac{9}{5}$

   Ans. :

   c. $\frac{5}{9}$

   Solution:

   Additive inverse of $\frac{-5}{9}$ is $= \left(\frac{5}{9}\right)$

5. Which of the following numbers is its own reciprocal:

   (A) 10 (B) Zero (C) $\frac{1}{5}$ (D) 1

   Ans. :

   d. 1

   Solution:

   The 1 and -1 are the two numbers which having reciprocal of its own. Except 1 and -1 no other numbers are not having its own reciprocal.

6. Which of the following statements is false?

   (A) Natural numbers are closed under subtraction.

   (B) Whole numbers are not closed under subtraction.

(C) Integers are closed under subtraction.

(D) Rational numbers are closed under subtraction.

Ans. :

a. Natural numbers are closed under subtraction.

7. The rational number which is equal to negative is:

(A) 0 (B) -1 (C) 1 (D) $\frac{1}{2}$

Ans. :

a. 0

8. One (1) is:

a. The identity for addition of rational numbers.
b. The identity for subtraction of rational numbers.
c. The identity for multiplication of rational numbers.
d. The identity for division of rational numbers.

Ans. :

c. The identity for multiplication of rational numbers.

Solution:

One (1) is the identity for multiplication of rational numbers.

That means,

If a is a rational number.

Then, a - 1 = 1 - a = a

Note: One (1) is the multiplication identity for integers and whole number also.

9. Multiplicative inverse of a negative rational number is:

a. A positive rational number.
b. A negative rational number.
c. 0
d. 1

Ans. :

b. A negative rational number.

Solution:

We know that, the product of two rational numbers is 1, taken they are multiplication inverse of each other, e.g.

Suppose, p is negative rational number, i.e.

$\frac{1}{\mathrm{p}}$ is the multiplicative inverse of -p,

Then, $-\mathrm{p} \times \frac{1}{-\mathrm{p}} = 1$

Hence, multiplicative inverse of a negative rational number is a negative rational number.

10. Mark $(\checkmark)$ against the correct answer of the following:

What should be subtracted from $\frac{-2}{3}$ to get $\frac{3}{4}$?

a. $\frac{-11}{12}$

b. $\frac{-13}{12}$

c. $\frac{-5}{4}$

d. $\frac{-17}{12}$

Ans. :

d. $\frac{-17}{12}$

Solution:

Let the number be x

Now,

$\frac{-2}{3} - \mathrm{x} = \frac{3}{4}$

$\Rightarrow -1 \times \left(\frac{2}{3} + \mathrm{x}\right) = \frac{3}{4}$

$\Rightarrow \frac{2}{3} + \mathrm{x} = \frac{-3}{4}$

$\Rightarrow \mathrm{x} = \frac{-3}{4} + \left(\text{Additive inverse of } \frac{2}{3}\right)$

$\Rightarrow \mathrm{x} = \frac{-3}{4} - \left(\frac{-2}{3}\right)$

$\Rightarrow \mathrm{x} = \frac{-3}{4} + \frac{2}{3}$

$\Rightarrow \mathrm{x} = \frac{-3\times3}{4\times3} + \frac{2\times4}{3\times4}$

$\Rightarrow \mathrm{x} = \frac{-9}{12} + \frac{-8}{12}$

$\Rightarrow \mathrm{x} = \frac{-17}{12}$

*** Questions With Calculation.[2 Marks Each]** **[8]**

11. Verify the property x × (y + z) = x × y + x × z of rational numbers by taking.

$\mathrm{x} = \frac{-1}{2}, \mathrm{y} = \frac{3}{4}, \mathrm{z} = \frac{1}{4}$

Ans. : Given, $\mathrm{x} = \frac{-1}{2}, \mathrm{y} = \frac{3}{4}, \mathrm{z} = \frac{1}{4}$

Now, $\mathrm{LHS} = \mathrm{x} \times (\mathrm{y} + \mathrm{z})$

$= \frac{-1}{2} \times \left(\frac{3}{4} + \frac{1}{4}\right)$

$= \frac{-1}{2} \times \frac{4}{4}$

$= \frac{-1}{2}$

and $\mathrm{RHS} = \mathrm{x} \times \mathrm{y} + \mathrm{x} \times \mathrm{z}$

$= \frac{-1}{2} \times \frac{3}{4} + \left(\frac{-1}{4}\right) \times \frac{1}{4}$

$= \frac{-3}{8} - \frac{1}{8}$

$= \frac{-3-1}{8}$

$= \frac{-4}{8}$

$= \frac{-1}{2}$

$\mathrm{LHS} = \mathrm{RHS}$

Hence, $\mathrm{x} \times (\mathrm{y} + \mathrm{z}) = \mathrm{x} \times \mathrm{y} + \mathrm{x} \times \mathrm{z}$

12. Simplify:

$1 + \frac{-4}{5}$

Ans. : $1 + \frac{-4}{5}$

The LCM of the denominator 1 and 5 is 5.

Now,

We need to express $\frac{1}{1}$ in the form in which it takes denominator as 5.

$\frac{1}{1} = \frac{1 \times 5}{1 \times 5} = \frac{5}{5}$

So,

$\frac{5}{5} + \frac{-4}{5}$

$= \frac{5-4}{5} = \frac{1}{5}$

13. $\left(\frac{25}{5} \times \frac{2}{5}\right) - \left(\frac{3}{5} \times \frac{-10}{9}\right)$

Ans. : $\left(\frac{25}{5} \times \frac{2}{5}\right) - \left(\frac{3}{5} \times \frac{-10}{9}\right)$

$= \frac{25 \times 2}{8 \times 5} - \frac{3 \times (-10)}{5 \times 9}$

$= \frac{5 \times 1}{4 \times 1} = \frac{1 \times (-2)}{1 \times 3} = \frac{5}{4} - \frac{-2}{3}$

$= \frac{15+8}{12} = \frac{23}{12}$

14. Fill in blanks:

$\frac{-7}{9} + \ldots\ldots\ldots = 3$

Ans. : $\frac{-7}{9} + \frac{34}{9} = 3$

Solution:

Required number $= 3 - \left(\frac{-7}{9}\right)$

$= \frac{3}{1} + \frac{7}{9}$

$= \frac{27+7}{9}$

$= \frac{34}{9}$

*** Questions With Calculation.[3 Marks Each]** **[12]**

15. Verify the property x × (y + z) = x × y + x × z of rational numbers by taking.

$\mathrm{x} = \frac{-1}{5}, \mathrm{y} = \frac{2}{15}, \mathrm{z} = \frac{-3}{10}$

Ans. : Given, $\mathrm{x} = \frac{-1}{5}, \mathrm{y} = \frac{2}{15}, \mathrm{z} = \frac{-3}{10}$

Now, $\mathrm{LHS} = \mathrm{x} \times (\mathrm{y} + \mathrm{z})$

$= \frac{-1}{5} \times \left(\frac{2}{15} + \frac{-3}{10}\right)$

$= \frac{-1}{5} \times \left(\frac{2}{15} - \frac{3}{10}\right)$

$= \frac{-1}{5} \times \left(\frac{4-9}{30}\right)$

$= \frac{-1}{5} \times \frac{-5}{30}$

$= \frac{1}{30}$

and $\mathrm{RHS} = \mathrm{x} \times \mathrm{y} + \mathrm{x} \times \mathrm{z}$

$= \frac{-1}{5} \times \frac{2}{15} + \left(\frac{-1}{5}\right) \times \left(\frac{-3}{10}\right)$

$= \frac{-2}{75} + \frac{3}{50}$

$= \frac{-4+9}{150}$

$= \frac{5}{150}$

$= \frac{1}{30}$

$\mathrm{LHS} = \mathrm{RHS}$

Hence, $\mathrm{x} \times (\mathrm{y} + \mathrm{z}) = \mathrm{x} \times \mathrm{y} + \mathrm{x} \times \mathrm{z}$

16. The cost of $2\frac{1}{3}\mathrm{m}$ metres of cloth is Rs. $75\frac{1}{4}$ Find the cost of cloth per metre.

Ans. : Cost of $2\frac{1}{3}\mathrm{m}$ or $\frac{7}{3}\mathrm{m}$ of cloths = Rs. $75\frac{1}{4}$

$= \mathrm{Rs}.\frac{301}{4}$

$\therefore$ Costof 1m cloth = Rs. $\frac{301}{4} \div \frac{7}{3}$

$= \mathrm{Rs}.\frac{301}{4} \times \frac{3}{7} = \mathrm{Rs}.\frac{43 \times 3}{4 \times 1}$

$= \mathrm{Rs}.\frac{129}{4} = \mathrm{Rs}.\ 32\frac{1}{4}$

$= \mathrm{Rs}.\ 32.25$

17. $\left(\frac{8}{5} \times \frac{-3}{2}\right) + \left(\frac{-3}{10} \times \frac{11}{16}\right)$

Ans. : $\left(\frac{8}{5} \times \frac{-3}{2}\right) + \left(\frac{-3}{10} \times \frac{11}{16}\right)$

$= \frac{8 \times (-30}{5 \times 2} + \frac{-3 \times 11}{10 \times 16}$

$= \frac{4 \times (-3)}{5 \times 1} + \frac{-3 \times 11}{10 \times 16}$

$= \frac{-12}{5} + \frac{-33}{160}$

$= \frac{-384-33}{160} = \frac{-417}{160}$

18. (i) If $x = 6, y = \frac{1}{9}, z = 0$ (ii) If $x = \frac{4}{5}, y = \frac{-9}{10}, z = \frac{43}{15}$

Then, verify the following properties and name them

(a) $x \times (y + z) = x \times y + x \times z$

(b) $x \times (y \times z) = (x \times y) \times z$

(c) $x \times y = y \times x$

(d) $x \times (y - z) = x \times y - x \times z$

Ans. : (i) For $x = 6, y = \frac{1}{9}$ and $z = 0$

(a) $x \times (y + z) = x \times y + x \times z$

This statement follow distributive property over addition.

LHS $= x \times (y + z) = 6 \times \left(\frac{1}{9} + 0\right) = 6 \times \frac{1}{9} = \frac{2}{3}$

RHS $= x \times y + x \times z = 6 \times \frac{1}{9} + 6 \times 0 = \frac{2}{3} + 0 = \frac{2}{3}$

(b) $x \times (y \times z) = (x \times y) \times z$

This statement follow associative property under multiplication

LHS $= x \times (y \times z) = 6 \times \left(\frac{1}{9} \times 0\right) = 6 \times 0 = 0$

$RHS = (x \times y) \times z = \left(6 \times \frac{1}{9}\right) \times 0 = \frac{2}{3} \times 0 = 0$

(c) $x \times y = y \times x$

This statement follow commutative property under multiplication.

LHS $= x \times y = 6 \times \frac{1}{9} = \frac{2}{3}$

$RHS = y \times x = \frac{1}{9} \times 6 = \frac{2}{3}$

(d) $x \times (y - z) = x \times y - x \times z$

This statement follow distributive property over subtraction.

$LHS = x \times (y - z) = 6 \times \left(\frac{1}{9} - 0\right) = 6 \times \frac{1}{9} = \frac{2}{3}$

$RHS = x \times y - x \times z = 6 \times \frac{1}{9} - 6 \times 0$

$= \frac{2}{3} - 0 = \frac{2}{3}$

(ii) $x = \frac{4}{5}, y = \frac{-9}{10}, z = \frac{43}{15}$

(a) $x \times (y + z) = x \times y + x \times z$

This statement follow distributive property over addition.

$LHS = x \times (y + z) = \frac{4}{5} \times \left(\frac{-9}{10} + \frac{43}{15}\right)$

$= \frac{4}{5} \times \frac{(-27+86)}{30} = \frac{4}{5} \times \frac{59}{30} = \frac{118}{75}$

$RHS = x \times y + x \times z = \frac{4}{5} \times \left(\frac{-9}{10}\right) + \frac{4}{5} \times \frac{43}{15}$

$= -\frac{18}{25} + \frac{172}{75} = \frac{-54+172}{75} = \frac{118}{75}$

(b) $x \times (y \times z) = (x \times y) \times z$

This statement follow associative property under multiplication.

LHS $= x \times (y \times z)$

$= \frac{4}{5} \times \left\{\left(\frac{-9}{10}\right) \times \frac{43}{15}\right\} = \frac{4}{5} \times \left(\frac{-129}{50}\right) = -\frac{516}{250}$

RHS $= (x \times y) \times z$

$= \left\{\frac{4}{5} \times \left(\frac{-9}{10}\right)\right\} \times \frac{43}{15} = \frac{-18}{25} \times \frac{43}{15}$

$= \frac{-258}{125} = \frac{-516}{250}$

(c) $x \times y = y \times x$

This statement follow commutative property under multiplication.

LHS $= x \times y = \frac{4}{5} \times \left(\frac{-9}{10}\right) = \frac{-18}{25}$

RHS $= y \times x = \frac{-9}{10} \times \frac{4}{5} = \frac{-18}{25}$

(d) $x \times (y - z) = x \times y - x \times z$

This statement follow distributive property under subtraction.

LHS $x \times (y - z) = \frac{4}{5} \times \left(\frac{-9}{10} - \frac{43}{15}\right) = \frac{4}{5} \times \left(\frac{-27-86}{30}\right)$

$= \frac{4}{5} \times \left(-\frac{113}{30}\right) = \frac{-226}{75}$

$RHS = x \times y - x \times z$

$= \frac{4}{5} \times \frac{-9}{10} - \frac{4}{5} \times \frac{43}{15} = \frac{-18}{25} - \frac{172}{75}$

$= \frac{-54-172}{75} = \frac{-226}{75}$

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