STD 8 Maths | Total Marks : 30

Rational Numbers DPP-4

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

1. Which of the following expressions shows that rational numbers are associative under multiplication:
   a. $\frac{2}{3} \times \left(\frac{-6}{7} \times \frac{3}{5}\right) = \left(\frac{2}{3} \times \frac{-6}{7}\right) \times \frac{3}{5}$
   b. $\frac{2}{3} \times \left(\frac{-6}{7} \times \frac{3}{5}\right) = \frac{2}{3} \times \left(\frac{3}{5} \times \frac{-6}{7}\right)$
   c. $\frac{2}{3} \times \left(\frac{-6}{7} \times \frac{3}{5}\right) = \left(\frac{3}{5} \times \frac{2}{3}\right) \times \frac{-6}{7}$
   d. $\left(\frac{2}{3} \times \frac{-6}{7}\right) \times \frac{3}{5} = \left(\frac{-6}{7} \times \frac{2}{3}\right) \times \frac{3}{5}$

   Ans. :

   a. $\frac{2}{3} \times \left(\frac{-6}{7} \times \frac{3}{5}\right) = \left(\frac{2}{3} \times \frac{-6}{7}\right) \times \frac{3}{5}$

   Solution:

   $\frac{2}{3} \times \left(\frac{-6}{7} \times \frac{3}{5}\right) = \left(\frac{2}{3} \times \frac{-6}{7}\right) \times \frac{3}{5}$

   [by associative property under multiplication, a × (b × c) = (a × b) × c]

   $\Rightarrow \frac{2}{3} \times \frac{-18}{35} = \frac{-12}{21} \times \frac{3}{5}$

   So, a × (b × c) = (a × b) × c

   Hence, the given expression shows that rational numbers are associative under multiplication.

2. If y be the reciprocal of rational number x, then the reciprocal of y will be:
   a. x
   b. y
   c. $\frac{x}{y}$
   d. $\frac{y}{x}$

   Ans. :

   a. x

   Solution:

   If y be the reciprocal of rational number x, i.e. $y = \frac{1}{x}$ or $x = \frac{1}{y}$.

   Hence, the reciprocal of y will be x.

3. $\frac{x+y}{2}$ is a rational number.
   a. Between x and y.
   b. Less than x and y both.
   c. Greater than x and y both.
   d. Less than x but greater than y.

   Ans. :

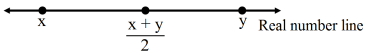
   a. Between x and y.

   Solution:

   Let x and y be two numbers.

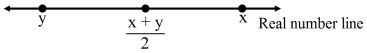
   Case-I If x < y

   Then, $\frac{x+y}{2}$ lies in between x and such that



Case-II If x < y

Then, $\frac{x+y}{2}$ lies in between x and y such that



4. If x be any rational number then x + 0 is equal to:
   a. x
   b. 0
   c. -x
   d. Not defined.

Ans. :

a. x

Solution:

If x is any rational number,

Then x + 0 = x [0 is the additive identity]

5. The reciprocal of 1 is:
   a. 1
   b. -1
   c. 0
   d. Not defined.

Ans. :

a. 1

Solution:

The reciprocal of 1 is the number itself.

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

   The sum of two rational numbers is -3. If one of them is $\frac{-10}{3}$ then the other one is:

   a. $\frac{-13}{3}$
   b. $\frac{-19}{3}$
   c. $\frac{1}{3}$
   d. $\frac{13}{3}$

Ans. :

c. $\frac{1}{3}$

Solution:

Sum = -3

One number $= \frac{-10}{3}$

$\therefore$ Second number $= -3 - \left(\frac{-10}{3}\right)$

$= -3 + \frac{10}{3}$

$= \frac{-9+10}{3}$

$= \frac{1}{3}$

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

   What should be added to $\frac{7}{12}$ to get $\frac{-4}{15}$?

   a. $\frac{17}{20}$

b. $\frac{-17}{20}$

c. $\frac{7}{20}$

d. $\frac{-7}{20}$

Ans. :

b. $\frac{-17}{20}$

Solution:

$\frac{-4}{15} - \frac{7}{12}$

$= \frac{-16-35}{60}$

$= \frac{-51}{60}$

$= \frac{-51 \div 3}{60 \div 3}$

$= \frac{-17}{20}$

8. The product of two numbers is $\frac{-16}{35}$. If one of the numbers is $\frac{-15}{14}$, the other is

(A) $\frac{-2}{5}$ (B) $\frac{8}{15}$ (C) $\frac{32}{75}$ (D) $\frac{-8}{3}$

Ans. : (C) $\frac{32}{75}$

9. A rational number between $\frac{-2}{3}$ and $\frac{1}{4}$ is

(A) $\frac{5}{12}$ (B) $\frac{-5}{12}$ (C) $\frac{5}{24}$ (D) $\frac{-5}{24}$

Ans. : (D) $\frac{-5}{24}$

10. Zero (0) 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.: (A) the identity for addition of rational numbers.

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

11. Express the following as a rational number of the form $\frac{p}{q}$:

$\frac{6}{7} + 1 + \frac{-7}{9} + \frac{19}{21} + \frac{-12}{7}$

Ans. : $\frac{6}{7} + 1 + \frac{-7}{9} + \frac{19}{21} + \frac{-12}{7}$

$= \frac{54}{63} + \frac{63}{63} + \frac{-49}{63} + \frac{57}{63} + \frac{-108}{63}$

$= \frac{54+63+(-49)+57+(-108)}{63}$

$= \frac{54+63-49+57-108}{63}$

$= \frac{17}{63}$

12. Find the multiplicative inverse (reciprocal) of the following rational numbers:

$\frac{-5}{8} \times \frac{16}{15}$

Ans. : Multiplicative inverse of $= \frac{-5}{8} \times \frac{16}{15}$

$= \frac{8}{-5} \times \frac{15}{16} = \frac{8 \times 15}{-5 \times 16}$

$= \frac{1\times3}{-1\times2} = \frac{3}{-2}$

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

13. Express the following rational numbers in standard form.

$\frac{-36}{-63}$

Ans. : $\frac{-36}{-63}$

H.C.F of 36 and 63 = 9

Dividing the numerator and denominator by -9, then

$\frac{-36}{-63} = \frac{36\div(-9)}{-63\div(-9)}$

$= \frac{4}{7}$

14. Simplify

(I) $\frac{3}{7} \times \frac{28}{15} \div \frac{14}{5}$

(ii) $\frac{3}{7} + \left(\frac{-2}{21}\right) \times \left(\frac{-5}{6}\right)$

Ans. : (i) We have, $\frac{3}{7} \times \frac{28}{15} \div \frac{14}{5} = \frac{3}{7} \times \frac{28}{15} \times \frac{5}{14} = \frac{3}{7} \times \left(\frac{28}{15} \times \frac{5}{14}\right) = \frac{3}{7} \times \frac{2}{3} = \frac{2}{7}$

(ii) We have, $\frac{3}{7} + \left(\frac{-2}{21}\right) \times \left(\frac{-5}{6}\right) = \frac{3}{7} + \left[\left(\frac{-2}{21}\right) \times \left(\frac{-5}{6}\right)\right]$

$= \frac{3}{7} + \left(\frac{-5}{-63}\right) = \frac{3}{7} + \frac{5}{63} = \frac{27+5}{63} = \frac{32}{63}$

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

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

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

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

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

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

$= \frac{-1}{2} \times \left(\frac{8+9}{12}\right)$

$= \frac{-1}{2} \times \frac{17}{12}$

$= \frac{-17}{24}$

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

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

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

$= \frac{-8-9}{24}$

$= \frac{-17}{24}$

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

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

16. Verify whether the given statement is true or false:

$\frac{-8}{9} \div \frac{-4}{3} = \frac{-4}{3} \div \frac{-8}{9}$

Ans. :

False.

Solution:

$\text{L.H.S.} = \frac{-8}{9} \div \frac{-4}{3}$

$= \frac{-8}{9} \times \frac{3}{-4}$

$= \frac{-8 \times 3}{9 \times (-4)}$

$= \frac{-24}{-36} = \frac{24}{36}$

$= \frac{24 \div 12}{36 \div 12}$

$= \frac{2}{3}$

$\text{R.H.S.} = \frac{-4}{3} \div \frac{-8}{9}$

$= \frac{-4}{3} \times \frac{9}{-8}$

$= \frac{-36}{-24} = \frac{36}{24}$

$= \frac{36 \div 12}{24 \div 12}$

$= \frac{3}{2}$

$\text{L.H.S} \neq \text{R.H.S}$

$\therefore$ It is false.

17. Represent the following numbers on the number line.

$-3\frac{1}{7}$

Ans. :

$-3\frac{1}{7}$

Draw a line and take a point O on it.

Let it represent 0.

Now, From O, take OA, AB to the left of O, is representing integers -1, -2, -3, -4

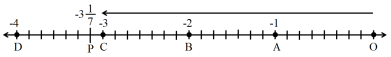
Divide CD into 7 equal parts and take 1 parts at P.

Then,

$\text{CP} = \frac{1}{7}$

$\therefore \text{OP} = \text{OC} + \text{CP}$

$-\left(3 + \frac{1}{7}\right) = -3\frac{1}{7}$ as shown on the number line given below,



18. If $\frac{3}{5}$ of a number exceeds its $\frac{2}{7}$ by 44, find the number.

Ans. :

Let number = 1

Then difference between $\frac{3}{5}$ and $\frac{2}{7}$

$= \frac{3}{5} - \frac{2}{7}$

$= \frac{21 - 10}{35}$

$= \frac{11}{35}$

$\therefore \frac{11}{35}$ of a number = 44

$\therefore$ Number $= 44 \div \frac{11}{35}$

$= 44 \times \frac{35}{11}$

$= \frac{1540}{11}$

$= 140$

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