STD 8 Maths | Total Marks : 30

Rational numbers DPP-2

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

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

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

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

   Ans. :

   c. $\frac{32}{75}$

   Solution:

   Let x be the required number

   Then,

   $\frac{-15}{14} \times x = \frac{-16}{35}$

   $\Rightarrow x = \frac{-16}{35} \div \frac{-15}{14}$

   $\Rightarrow x = \frac{-16}{35} \times \frac{14}{-15}$

   $\Rightarrow \frac{-224}{-525} = \frac{224}{525}$

   $= \frac{224 \div 7}{525 \div 7}$

   $= \frac{32}{75}$

2. Which of the following is an example of distributive property of multiplication over addition for rational numbers.

   (A) $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \left[-\frac{1}{4} \times \frac{2}{3}\right] + \left[-\frac{1}{4} \times \left(\frac{-4}{7}\right)\right]$

   (B) $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \left[\frac{1}{4} \times \frac{2}{3}\right] - \left(\frac{-4}{7}\right)$

   (C) $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \frac{2}{3} + \left(-\frac{1}{4}\right) \times \frac{-4}{7}$

   (D) $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} - \frac{1}{4}$

   Ans. :

   a. $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \left[-\frac{1}{4} \times \frac{2}{3}\right] + \left[-\frac{1}{4} \times \left(\frac{-4}{7}\right)\right]$

   Solution:

   We know that, the distributive property of multiplication over addition for rational numbers can be expressed as a x (b + c) = ab + ac, where a, b and c are rational numbers.

   Here, $-\frac{1}{4} \times \left\{\frac{2}{3} + \left(\frac{-4}{7}\right)\right\} = \left[-\frac{1}{4} \times \frac{2}{3}\right] + \left[-\frac{1}{4} \times \left(\frac{-4}{7}\right)\right]$

   Is the example of distributive property of multiplication over addition for rational numbers.

3. 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.

4. Which of the following statement is true?

(A) The difference of two rational numbers is always a rational number.

(B) Addition of two rational numbers is associative.

(C) Addition of two rational numbers is commutative.

(D) All of the above.

Ans. :

d. All of the above.

Solution:

As we know that difference of two rational numbers is always a rational number.

$\Rightarrow \frac{4}{9} - \frac{2}{9} = \frac{2}{9}$ (The difference of two rational numbers is always a rational number)

And, $-\frac{3}{7} + \frac{1}{3} = \frac{1}{3} + \left(-\frac{3}{7}\right)$

$\Rightarrow -\frac{2}{21} = -\frac{2}{21}$ (Addition of two rational numbers is commutative)

Also, $\frac{3}{15}\left(\frac{4}{15} + \frac{2}{15}\right) = \left(\frac{3}{15} + \frac{2}{15}\right) + \frac{2}{15}$

$\Rightarrow \frac{9}{15} = \frac{9}{15}$ (Addition of two numbers is associative)

There all the given statements are true.

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

$\left(3 + \frac{5}{-7}\right) = \ ?$

(A) $\frac{-16}{7}$ (B) $\frac{16}{7}$ (C) $\frac{-26}{7}$ (D) $\frac{-8}{7}$

Ans. :

b. $\frac{16}{7}$

Solution:

$3 + \frac{5}{-7}$

$= \frac{-21+5}{7}$

$= \frac{-16}{-7}$

$= \frac{16}{7}$

6. a × (b × c) = (a × b) × c is called:

(A) Associative law for addition (B) Associative law for multiplication

(C) Commutative law for addition (D) Commutative law for multiplication

Ans. :

b. Associative law for multiplication

7. Which of the following numbers lies in the middle of $\frac{3}{4}$ and $\frac{7}{4}$:

(A) 5.0 (B) 3.0 (C) 2.5 (D) 1.25

Ans. :

d. 1.25

Solution:

$\frac{3}{4} = 0.75$ and $\frac{7}{4} = 1.75$

Here we see 1.25 lies between 0.75 and 1.75.

8. A number which can be expressed as $\frac{p}{q}$ where p and q are integers and $q \neq 0$ is:

(A) Natural number. (B) Whole number. (C) Integer. (D) Rational number.

Ans. :

d. Rational number.

Solution:

A number Which can be experssed as $\frac{p}{q}$, where p and q are integers $q \neq 0$ is a rational number.

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

What should be added to $\frac{-3}{5}$ get $\frac{-1}{3}$?

(A) $\frac{4}{5}$ (B) $\frac{8}{15}$ (C) $\frac{4}{15}$ (D) $\frac{2}{5}$

Ans. :

c. $\frac{4}{15}$

Solution:

Let the number added be x

Then,

$\frac{-3}{5} + x = \frac{-1}{3}$

$\Rightarrow x = \frac{1}{3} - \frac{-3}{5}$

$\Rightarrow x = \frac{-1\times5-(-3)\times3}{15}$

$\Rightarrow x = \frac{-5+9}{15}$

$\Rightarrow x = \frac{4}{15}$

10. Which of the following numbers is the simplest form of $\frac{3}{4} + \left(\frac{-1}{4}\right) + \left(\frac{-5}{4}\right)$

(A) $\frac{9}{4}$ (B) $-\frac{3}{4}$ (C) $-\frac{9}{4}$ (D) $\frac{7}{4}$

Ans. :

b. $-\frac{3}{4}$

Solution:

$\frac{3}{4} + \left(\frac{-1}{4}\right) + \left(\frac{-5}{4}\right)$

$= \frac{3}{4} - \frac{1}{4} - \frac{5}{4}$

$= \frac{3-1-5}{4}$

$= \frac{3-6}{4}$

$-\frac{3}{4}$

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

11. Find $\frac{3}{7} + \left(\frac{-6}{11}\right) + \left(\frac{-8}{21}\right) + \left(\frac{5}{22}\right)$

Ans. : We have, $\frac{3}{7} + \left(\frac{-6}{11}\right) + \left(\frac{-8}{21}\right) + \left(\frac{5}{22}\right)$

$= \frac{198}{462} + \left(\frac{-252}{462}\right) + \left(\frac{-176}{462}\right) + \left(\frac{105}{462}\right)$ [$\because$ 462 is the LCM of 7, 11, 21 and 22]

$= \frac{198-252-176+105}{462}$

$= \frac{-125}{462}$

Alternatively: We can also solve it as.

$\frac{3}{7} + \left(\frac{-6}{11}\right) + \left(\frac{-8}{21}\right) + \frac{5}{22}$

$= \left[\frac{3}{7} + \left(\frac{-8}{21}\right)\right] + \left[\frac{-6}{11} + \frac{5}{22}\right]$

$= \left[\frac{9+(-8)}{21}\right] + \left[\frac{-12+5}{22}\right]$ [$\because$LCM of 7 and 21 is 21; LCM of 11 and 22 is 22]

$= \frac{1}{21} + \left(\frac{-7}{22}\right)$

$= \frac{22-147}{462}$

$= \frac{-125}{462}$

12. $\left(\frac{-4}{3} \times \frac{12}{-5}\right) + \left(\frac{3}{7} \times \frac{21}{15}\right)$

Ans. : $\left(\frac{-4}{3} \times \frac{12}{-5}\right) + \left(\frac{3}{7} \times \frac{21}{15}\right) = \frac{-4\times12}{3\times(-5)} + \frac{3\times21}{7\times15} = \frac{-4\times4}{1\times(-5)} + \frac{1\times3}{1\times5} = \frac{-16}{-5} + \frac{3}{5} = \frac{16}{5} + \frac{3}{5} = \frac{16+3}{5} = \frac{19}{5}$

13. The cost of $7\frac{2}{3}$ metres of rope is Rs $12\frac{3}{4}$ Find its cost per metre.

Ans. : Cost of $7\frac{2}{3}\text{m}$ of rope = Rs. $12\frac{3}{4}$ or cost of $\frac{23}{3}\text{m}$ of rope = Rs. $\frac{51}{4}$ $\therefore$ Cost of 1m of rope = Rs. $\frac{51}{4} \div \frac{23}{3} = \text{Rs.}\frac{51}{4} \times \frac{3}{23} = \text{Rs.}\frac{153}{92} = \text{Rs.}1\frac{61}{92}$

14. Simplify:

$\left(\frac{13}{9} \times \frac{-15}{2}\right) + \left(\frac{7}{3} \times \frac{8}{5}\right) + \left(\frac{3}{5} \times \frac{1}{2}\right)$

Ans. : $\left(\frac{13}{9} \times \frac{-15}{2}\right) + \left(\frac{7}{3} \times \frac{8}{5}\right) + \left(\frac{3}{5} \times \frac{1}{2}\right) = \frac{-13\times5}{6} + \frac{7\times8}{15} + \frac{3}{10} = \frac{-65}{6} + \frac{56}{15} + \frac{3}{10} = \frac{-65\times5+56\times2+3\times3}{30}$

$= \frac{-204}{30} = \frac{-34}{5}$

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

15. Verify associativity of addition of rational numbers i.e., (x + y) + z = x + (y + z), when:

$x = -2, y = \frac{3}{5}, z = \frac{-4}{3}$

Ans. : $x=-2, y=\frac{3}{5}, z=\frac{-4}{3}$ So, $(x+y)+z=\left(-2+\frac{3}{5}\right)+\frac{-4}{3}=\left(\frac{-10}{5}+\frac{3}{5}\right)+\frac{-4}{3}=\frac{-7}{5}+\frac{-4}{3}$

$=\frac{-21}{15}+\frac{-20}{15}=\frac{-21-20}{15}=\frac{-41}{15}$ $x(y+z)=-2+\left(\frac{3}{5}+\frac{-4}{3}\right)=\frac{-2}{1}+\left(\frac{9}{15}+\frac{-20}{15}\right)=\frac{-2}{1}+\frac{-11}{15}=\frac{-30}{15}+\frac{-11}{15}$

$=\frac{-30-11}{15}=\frac{-41}{15}$ $\therefore\left(-2+\frac{3}{5}\right)+\frac{-4}{3}=-2+\left(\frac{3}{5}+\frac{-4}{3}\right)$

16. Amit earns Rs. 32000 per month. He spends $\frac{1}{4}$ of his income of food; $\frac{3}{10}$ of the remainder on house rent and $\frac{5}{21}$ of the remainder on the education of children. How much money is still left with him?

Ans. :

Total amount eamed by Amit = Rs. 32000

Amount spent on food $=\frac{1}{4}$ of Rs. 32000

$=\frac{1}{4}\times \text{Rs. } 32000-\text{Rs. } 8000$

Balance = Rs. 32000 - Rs. 8000

= Rs. 24000

Amount spent on house rent $=\frac{3}{10}$ of Rs. 24000

$=\frac{3}{10}\times \text{Rs. } 24000$

$=3\times \text{Rs. } 2400$

$=\text{Rs. } 7200$

Amount left = Rs. 24000 - Rs. 37200

= Rs. 16800

Amount spent on education of children $=\frac{5}{21}$ of Rs. 16800

$=\frac{5}{21}\times \text{Rs. } 16800$

$=\text{Rs. } 5\times 800$

$=\text{Rs. } 4000$

Amount left = Rs. 16800 - Rs. 4000

= Rs. 12800

17. Arrange the following rational numbers in descending order:

$\frac{-3}{10}, \frac{7}{-15}, \frac{-11}{20}, \frac{17}{-30}$

Ans. : Among $\frac{-3}{10}, \frac{7}{-15}, \frac{-11}{20}, \frac{17}{-30}$ Making their denominator of $\frac{7}{-15}$ and $\frac{17}{-30}$, as positive then $\frac{-3}{10}, \frac{-7}{15}, \frac{-11}{20}, \frac{-17}{30}$ Now, LCM of 10, 15, 20, 30 = 60 $\therefore \frac{-3}{10}=\frac{-3\times 6}{10\times 6}=\frac{-18}{60}$ $\frac{-7}{15}=\frac{-7\times 4}{15\times 4}=\frac{-28}{60}$

$\frac{-11}{20}=\frac{-11\times 3}{20\times 3}=\frac{-33}{60}$ $\frac{-17}{30}=\frac{-17\times 2}{30\times 2}=\frac{-34}{60}$ Now, writing them in descending orders, We get,

$\frac{18}{60}>\frac{-28}{60}>\frac{-33}{60}>\frac{-34}{60}$

Or $\frac{-3}{10}>\frac{-7}{15}>\frac{-11}{20}>\frac{-17}{30}$ $\frac{-3}{10}>\frac{7}{-15}>\frac{-11}{20}>\frac{17}{-30}$

18. Find three rational numbers between $\frac{2}{3}$ and $\frac{3}{4}$.

Ans. : First rational number between $\frac{2}{3}$ and $\frac{3}{4}=\frac{1}{2}\left[\frac{2}{3}+\frac{3}{4}\right]=\frac{1}{2}\left[\frac{8+9}{12}\right]=\frac{1}{2}\times\frac{17}{12}=\frac{17}{24}$

$\therefore \frac{2}{3}<\frac{17}{24}<\frac{3}{4}$

Second rational number between $\frac{2}{3}$ and $\frac{17}{24}$

$=\frac{1}{2}\left[\frac{2}{3}+\frac{17}{24}\right]=\frac{1}{2}\left[\frac{16+17}{24}\right]=\frac{1}{2}\times\frac{33}{24}=\frac{33}{48}$

and third rational number between $\frac{17}{24}$ and $\frac{3}{4}$

$= \frac{1}{2}\left[\frac{17}{24} + \frac{3}{4}\right] = \frac{1}{2}\left[\frac{17+18}{24}\right] = \frac{1}{2} \times \frac{35}{24} = \frac{35}{48}$ $\therefore \frac{2}{3} < \frac{33}{48} < \frac{17}{24} < \frac{35}{48} < \frac{3}{4}$ $\therefore$ Required three rational numbers $\frac{33}{48}, \frac{17}{24}, \frac{35}{48}$

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