

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

[10]

1. Find $\frac{-3}{5} \times \frac{7}{9} \times \frac{21}{13} \times \frac{-2}{3}$

(A) $\frac{99}{193}$

(B) $\frac{98}{195}$

(C) $\frac{98}{190}$

(D) $\frac{90}{140}$

Ans. :

b. $\frac{98}{195}$

Solution:

We have $\frac{-3}{5} \times \frac{7}{9} \times \frac{21}{13} \times \frac{-2}{3}$

$$\Rightarrow \left(\frac{-3}{5}\right) \times \left(\frac{21}{13} \times \frac{-2}{3}\right)$$

$$\Rightarrow \left(\frac{-7}{15}\right) \times \left(\frac{-14}{13}\right)$$

$$\Rightarrow \frac{98}{195}$$

Therefore, the product is $\frac{98}{195}$.

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

$\left(\frac{-9}{16} \times \frac{8}{15}\right) = ?$

(A) $\frac{-3}{10}$

(B) $\frac{-4}{15}$

(C) $\frac{-9}{25}$

(D) $\frac{-2}{5}$

Ans. :

b. $\frac{-3}{10}$

Solution:

$$= \frac{-9}{16} \times \frac{8}{15}$$

$$= \frac{-9 \times 8}{16 \times 15}$$

$$= \frac{-72}{240}$$

$$= \frac{-72 \div 24}{240 \div 24}$$

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

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

$\left(\frac{2}{3} + \frac{-4}{5} + \frac{7}{15} + \frac{-11}{20}\right) = ?$

(A) $\frac{-1}{5}$

(B) $\frac{-4}{15}$

(C) $\frac{-13}{60}$

(D) $\frac{-7}{30}$

Ans. :

b. $\frac{-4}{15}$

Solution:

LCM of 3, 5, 15 and 20 = 60

$$\therefore \frac{2}{3} + \frac{-4}{5} + \frac{7}{15} + \frac{-11}{20}$$

$$\begin{aligned}
&= \frac{40+(-48)+28+(-33)}{60} \\
&= \frac{40-48+28-33}{60} \\
&= \frac{68-81}{60} \\
&= \frac{-13}{60}
\end{aligned}$$

4. The reciprocal of $\frac{-3}{8} \times \left(\frac{-7}{13}\right)$ is:

(A) $\frac{104}{21}$

(B) $\frac{-104}{21}$

(C) $\frac{21}{104}$

(D) $\frac{-21}{104}$

Ans. :

a. $\frac{104}{21}$

Solution:

Given number is $\frac{-3}{8} \times \left(\frac{-7}{13}\right)$

The product of $-\frac{3}{8} \times \left(\frac{-7}{13}\right) = \frac{21}{104}$.

Hence, the multiplicative inverse of $\frac{21}{104}$ is $\frac{104}{21}$.

5. 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, $a \times (b \times c) = (a \times b) \times c$]

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

So, $a \times (b \times c) = (a \times b) \times c$

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

6. Which of the following is a rational number between $\frac{1}{4}$ and $\frac{1}{3}$?

(A) $\frac{7}{24}$

(B) $\frac{8}{15}$

(C) $\frac{13}{48}$

(D) Both (a) and (c)

Ans. :

d. Both (a) and (c)

7. Multiplicative inverse of a negative rational number is

(A) 0

(B) -1

(C) a negative rational number

(D) a positive rational number

Ans. : (D) a positive rational number

8. The multiplicative inverse of $\frac{-3}{8} \times \left(\frac{-24}{13}\right)$ is

(A) $\frac{9}{13}$

(B) $\frac{-9}{13}$

(C) $\frac{-13}{9}$

(D) $\frac{13}{9}$

Ans. : (D) $\frac{13}{9}$

9. Which of the following number does not have multiplicative inverse?

(A) 1

(B) -1

(C) 0

(D) None of these

Ans. : (C) 0

10. If $\frac{a}{b}$ is the multiplicative inverse of a number x , then multiplicative inverse of $\frac{a}{b}$ is

(A) $\frac{1}{x}$

(B) x

(C) $\frac{ax}{b}$

(D) $\frac{xb}{a}$

Ans. : (B) x

*** 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. : Commutative property of multiplication

12. What should be added to $\left(\frac{2}{3} + \frac{3}{5}\right)$ to get $\frac{-12}{15}$?

Ans. : The required number $= \frac{-2}{15} - \left(\frac{2}{3} + \frac{3}{5}\right)$

$$= \frac{-2}{15} - \frac{19}{15} = \frac{-2-19}{15}$$

$$= \frac{-21}{15} = \frac{-21 \div 3}{15 \div 3} = \frac{-7}{5}$$

13. The sum of two numbers is $\frac{-4}{3}$. If one of the numbers is -5, find the other.

Ans. : Sum of two number $= \frac{-4}{3}$

One number $= -5$

$\therefore$ Second number $= \frac{-4}{3} - (-5)$

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

$$= \frac{-4+15}{3} = \frac{11}{3}$$

14. Find ten rational number between $\frac{-2}{5}$ and $\frac{1}{2}$.

Ans. : $\therefore \frac{-2}{5} = \frac{-2 \times 4}{5 \times 4} = \frac{-8}{20}$

and $\frac{1}{2} = \frac{1 \times 10}{2 \times 10} = \frac{10}{20}$

Now number lying between -8, 10 will be

-7, -6, -5, -4, -3, -2, -1, 0, 1, 2, 3, 4,.....9

$\therefore$ The rational number will be

$$\frac{-7}{20}, \frac{-6}{20}, \frac{-5}{20}, \frac{-4}{20}, \dots, \frac{8}{20}, \frac{9}{20}$$

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

[12]

15. Simplify:

$$\left(\frac{3}{11} \times \frac{5}{6}\right) - \left(\frac{9}{12} \times \frac{4}{3}\right) + \left(\frac{5}{13} \times \frac{6}{15}\right)$$

$$\text{Ans. : } \left(\frac{3}{11} \times \frac{5}{6}\right) - \left(\frac{9}{12} \times \frac{4}{3}\right) + \left(\frac{5}{13} \times \frac{6}{15}\right)$$

$$= \frac{3 \times 5}{11 \times 6} - \frac{9 \times 4}{12 \times 3} + \frac{5 \times 6}{13 \times 15}$$

$$= \frac{1 \times 5}{11 \times 2} - \frac{3 \times 1}{3} + \frac{1 \times 2}{13 \times 1}$$

$$= \frac{5}{22} - 1 + \frac{2}{13}$$

$$= \frac{65 - 286 + 44}{286} \text{ (LCM of 22, 13 = 286)}$$

$$= \frac{109 - 286}{286} = \frac{-177}{286}$$

16. Simplify each of the following by using suitable property. Also, name the properties.

$$(i) \left[\frac{1}{2} \times \frac{1}{4}\right] + \left[\frac{1}{2} \times 6\right]$$

$$(ii) \left[\frac{1}{5} \times \frac{2}{15}\right] - \left[\frac{1}{5} \times \frac{2}{5}\right]$$

$$(iii) \frac{-3}{5} \times \left[\frac{3}{7} + \left(\frac{-5}{6}\right)\right]$$

$$\text{Ans. : } (i) \left[\frac{1}{2} \times \frac{1}{4}\right] + \left[\frac{1}{2} \times 6\right] = \frac{1}{2} \times \left[\frac{1}{4} + 6\right] \quad [\text{by distributive property over addition}]$$

$$= \frac{1}{2} \times \left[\frac{1+24}{4}\right] = \frac{25}{8}$$

$$(ii) \left[\frac{1}{5} \times \frac{2}{15}\right] - \left[\frac{1}{5} \times \frac{2}{5}\right] = \left[\frac{1}{5} \times \frac{2}{15}\right] + \left[\frac{1}{5} \times \left(\frac{-2}{5}\right)\right]$$

$$= \frac{1}{5} \times \left[\frac{2}{15} - \frac{2}{5}\right] \quad [\text{by distributive property over addition}]$$

$$= \frac{1}{5} \times \left[\frac{2-6}{15}\right] = \frac{-4}{75}$$

$$(iii) \frac{-3}{5} \times \left\{\frac{3}{7} + \left(\frac{-5}{6}\right)\right\} = \frac{-3}{5} \times \frac{3}{7} + \left(\frac{-3}{5}\right) \times \left(\frac{-5}{6}\right) \quad [\text{by distributive property}]$$

$$= \frac{-9}{35} + \frac{15}{30} = \frac{-54+105}{210} = \frac{51}{210} = \frac{17}{70}$$

17. State which property is in the following and verify it.

$$(i) \frac{19}{50} \times \left(\frac{50}{38} \times \frac{5}{19}\right) = \left(\frac{19}{50} \times \frac{50}{38}\right) \times \frac{5}{19}$$

$$(ii) \frac{-6}{5} + \left\{\frac{2}{15} + \left(\frac{-9}{25}\right)\right\} = \left\{\left(\frac{-6}{5}\right) + \frac{2}{15}\right\} + \left(\frac{-9}{25}\right)$$

$$(iii) \frac{6}{19} \times \left\{\frac{4}{15} - \frac{2}{5}\right\} = \frac{6}{19} \times \frac{4}{15} - \frac{6}{19} \times \frac{2}{5}$$

$$\text{Ans. : } (i) \frac{19}{50} \times \left(\frac{50}{38} \times \frac{5}{19}\right) = \left(\frac{19}{50} \times \frac{50}{38}\right) \times \frac{5}{19}$$

This statement follow associative property under multiplication

$$\text{LHS} = \frac{19}{50} \times \left(\frac{50}{38} \times \frac{5}{19}\right) = \frac{19}{50} \times \frac{50 \times 5}{38 \times 19} = \frac{5}{38}$$

$$\text{RHS} = \left(\frac{19}{50} \times \frac{50}{38}\right) \times \frac{5}{19} = \frac{1}{2} \times \frac{5}{19} = \frac{5}{38}$$

$$(ii) \frac{-6}{5} + \left[\frac{2}{15} + \left(\frac{-9}{25}\right)\right] = \left[\left(\frac{-6}{5}\right) + \frac{2}{15}\right] + \left(\frac{-9}{25}\right)$$

This statement follow associative property under addition.

$$\text{LHS} = \frac{-6}{5} + \left[\frac{2}{15} + \left(\frac{-9}{25}\right)\right]$$

$$= \frac{-6}{5} + \left(\frac{2}{15} - \frac{9}{25}\right) = \frac{-6}{5} + \left(\frac{10-9}{25}\right) = \frac{-6}{5} + \frac{1}{25}$$

$$= \frac{-6}{5} + \frac{1}{25} = \frac{-30+1}{25} = \frac{-29}{25}$$

$$\text{RHS} = \left[\left(\frac{-6}{5} \right) + \frac{2}{5} \right] + \left(\frac{-9}{25} \right)$$

$$= \left(\frac{-6}{5} + \frac{2}{5} \right) - \frac{9}{25} = \frac{-4}{5} - \frac{9}{25} = \frac{-20-9}{25} = \frac{-29}{25}$$

$$\text{(iii)} \quad \frac{6}{19} \times \left(\frac{4}{15} - \frac{2}{5} \right) = \frac{6}{19} \times \frac{4}{15} - \frac{6}{19} \times \frac{2}{5}$$

This statement follow distributive property over subtraction.

$$\text{LHS} = \frac{6}{19} \times \left(\frac{4}{15} - \frac{2}{5} \right)$$

$$= \frac{6}{19} \times \left(\frac{4-6}{15} \right) = \frac{6}{19} \times \frac{(-2)}{15} = \frac{2 \times (-2)}{19 \times 5} = \frac{-4}{95}$$

$$\text{RHS} = \frac{6}{19} \times \frac{4}{15} - \frac{6}{19} \times \frac{2}{5}$$

$$= \frac{8}{95} - \frac{12}{95} = \frac{8-12}{95} = \frac{-4}{95}$$

18. Find the following expression using the appropriate property.

$$\text{(i)} \quad 0 \div \left(\frac{2}{3} \times \frac{9}{16} \right)$$

$$\text{(ii)} \quad \frac{16}{9} \times \left(\frac{-14}{17} \right) \times \left(\frac{-27}{4} \right) \times \frac{51}{49}$$

$$\text{(iii)} \quad \frac{4}{9} \times \frac{19}{20} - \frac{4}{9} \times \frac{1}{20}$$

$$\text{(iv)} \quad \frac{5}{2} \times \frac{1}{10} + \frac{2}{7} - \frac{9}{4} \times \frac{1}{10}$$

$$\text{Ans. : (i)} \quad 0 \div \left(\frac{2}{3} \times \frac{9}{16} \right)$$

Since, $\frac{2}{3}$ and $\frac{9}{16}$ are rational numbers. So, $\frac{2}{3} \times \frac{9}{16}$ will be a rational number.

[$\therefore$ product of 2 rational numbers is also a rational number]

$$\therefore 0 \div \left(\frac{p}{q} \right) = 0, \quad [\text{where } \frac{p}{q} \text{ is a rational number}]$$

and when we divide 0 by any non-zero rational number, we get 0

$$\Rightarrow 0 \div \left(\frac{2}{3} \times \frac{9}{16} \right) = 0$$

$$\text{(ii)} \quad \frac{16}{9} \times \left(\frac{-14}{17} \right) \times \left(\frac{-27}{4} \right) \times \frac{51}{49}$$

$$= \frac{16}{9} \times \left[\left(\frac{-14}{17} \right) \times \left(\frac{-27}{4} \right) \right] \times \frac{51}{49}$$

$$= \frac{16}{9} \times \left[\left(\frac{-27}{4} \right) \times \left(\frac{-14}{17} \right) \right] \times \frac{51}{49} \quad [\text{by commutative property}]$$

$$= \frac{16}{9} \times \left(\frac{-27}{4} \right) \times \left[\left(\frac{-14}{17} \right) \times \frac{51}{49} \right] \quad [\text{by associative property}]$$

$$= \frac{16 \times (-27)}{9 \times 4} \times \frac{(-14) \times 51}{17 \times 49} = \frac{4 \times (-3)}{1} \times \frac{(-2) \times 3}{7} = \frac{72}{7}$$

$$\text{(iii)} \quad \frac{4}{9} \times \frac{19}{20} - \frac{4}{9} \times \frac{1}{20} = \frac{4}{9} \times \left(\frac{19}{20} - \frac{1}{20} \right) \quad [\text{by distributive property over subtraction of rational numbers}]$$

$$= \frac{4}{9} \times \left(\frac{19-1}{20} \right)$$

$$= \frac{4}{9} \times \frac{18}{20} = \frac{4 \times 18}{9 \times 20} = \frac{2}{5}$$

$$\text{(iv)} \quad \frac{5}{2} \times \frac{1}{10} + \frac{2}{7} - \frac{9}{4} \times \frac{1}{10}$$

$$= \frac{5}{2} \times \frac{1}{10} + \left[\frac{2}{7} + \left(\frac{-9}{4} \right) \times \frac{1}{10} \right]$$

$$= \frac{5}{2} \times \frac{1}{10} + \left[\left(\frac{-9}{4} \right) \times \frac{1}{10} + \frac{2}{7} \right] \quad \text{[by commutative property for addition of rational numbers]}$$

$$= \left[\frac{5}{2} \times \frac{1}{10} + \left(\frac{-9}{4} \right) \times \frac{1}{10} \right] + \frac{2}{7} \quad \text{[by associative property]}$$

$$= \left(\frac{10-9}{4 \times 10} \right) + \frac{2}{7}$$

$$= \frac{1}{40} + \frac{2}{7} = \frac{7+40 \times 2}{40 \times 7} = \frac{87}{280}$$
