2~~4~~4.21

To verify subtraction is not Associative for Rational Numbers.

$$\underbrace{\frac{2}{3} - \left[\frac{4}{5} - \frac{-1}{2}\right]}_{LHS} \qquad \left[\frac{2}{3} - \frac{4}{5}\right] - \frac{-1}{2}$$

$$= \frac{2}{3} - \left[\frac{4}{5} - \frac{-1}{2}\right] \qquad = \left(\frac{10-12}{15}\right) + \frac{1}{2}$$

$$= \frac{2}{3} - \left[\frac{8-(-5)}{10}\right] \qquad = \frac{-2}{15} + \frac{1}{2}$$

$$= \frac{2}{3} - \left(\frac{8+5}{10}\right) \qquad = \frac{-4+15}{30}$$

$$= \frac{2}{3} - \frac{13}{10} \qquad = \frac{11}{30}$$

$$= \frac{20-39}{30}$$

$$= \frac{-19}{30}$$

Thus, $\frac{2}{3} - \left[\frac{4}{5} - \frac{-1}{2}\right] \neq \left(\frac{2}{3} - \frac{4}{5}\right) - \frac{-1}{2}$

Hence, subtraction is not Associative for rational numbers.

Division is not Associative for Rational Numbers.

Example-1 Page-9

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

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

$$= \frac{9-8}{21} + \frac{-12+5}{22}$$

$= \frac{1}{21} + \frac{-7}{22}$

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

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

Example -2

Pg -10

$$-\frac{4}{5} \times \underbrace{\frac{3}{7} \times \frac{15}{16}} \times \frac{(-14)}{9}$$

$$= \frac{\cancel{-4}^{1}}{\cancel{5}_{1}} \times \frac{\cancel{15}^{3}}{\cancel{16}_{4}} \times \frac{\cancel{3}^{1}}{7} \times \frac{\cancel{(-14)}^{2}}{\cancel{9}_{3}}$$ [Commutativity of Multiplication]

$= \frac{\cancel{-3}}{\cancel{4}_{2}} \times \frac{\cancel{-2}^{1}}{\cancel{3}_{1}}$

$= \frac{1}{2}$ (Ans)

Role of Zero

For any rational number 'a'

$a + 0 = a$
$0 + a = a$

$\frac{-3}{8} + 0 = \frac{-3}{8}$

$0 + \frac{7}{4} = \frac{7}{4}$

Zero is called "Additive Identity"

24.4.21

For any rational number 'a'

$a \times 0 = 0$

and $0 \times a = 0$

Role of 1

For any rational number 'a'

$a \times 1 = a$

$1 \times a = a$

1 is called "multiplicative identity"

H.W (In H.W. Notebook)

H.W. :— Go through the 'Negative of a Number' and Reciprocal

Distributive property of multiplication

(Page No. 11, 12 and 13)

Examples 3, 4 and 5 (Pg. – 13 and 19)

26·4·21

Negative of a number.

For any rational number 'a', we have

$$a + (-a) = 0$$

The negative of a is (-a)
and the negative of (-a) is a
we say that 'Additive Inverse' of a is (-a) and additive inverse of (-a) is a.

Example:

Additive Inverse of $\frac{7}{4}$ is $\frac{-7}{4}$
and Additive Inverse of $\frac{-7}{4}$ is $\frac{7}{4}$.

Reciprocal:

For any rational number, $a \neq 0$ we have

$$a \times \frac{1}{a} = 1 \text{ and } \frac{1}{a} \times a = 1$$

we say that for rational number $a \neq 0$, the reciprocal, the reciprocal of a is $\frac{1}{a}$ and the reciprocal of $\frac{1}{a}$ is a.

Also we say the multiplicative inverse of rational no. $a \neq 0$ is $\frac{1}{a}$.

The multiplicative Inverse does not exist for 0.

Example: Multiplicative Inverse of $\frac{3}{8}$ is $\frac{8}{3}$

Multiplicative " " $\frac{8}{3}$ " $\frac{3}{8}$

" " " $\frac{-4}{9}$ is $\frac{-9}{4}$

and " " " $\frac{-9}{4}$ is $\frac{-4}{9}$

H.W. → Exercise - 1.1

Q. No. 2, 4, 5, 6, and 7.