ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

Sub: Arithmetic **Class: 7** **Date: 05.05.20**

STUDY MATERIAL: Rational Numbers

Important Formulae and Concepts

Introduction to Rational Numbers

Introduction: Rational Numbers

- A **rational number** is defined as a number that can be expressed in the form pq, where p and q are integers and q≠0.
- In our daily lives, we use some quantities which are not whole numbers but can be expressed in the form of $\frac{p}{q}$. Hence we need rational numbers.

Equivalent Rational Numbers

- By **multiplying or dividing the numerator and denominator** of a rational number by a **same non zero integer**, we obtain another rational number equivalent to the given rational number.These are called **equivalent fractions**.
- $\frac{1}{3} = \frac{1}{3} \times \frac{2}{2} = \frac{2}{6}$
  ∴26 and 13 are equivalent fractions.
- $\frac{15}{25} = \frac{15 \div 5}{25 \div 5} = \frac{3}{5} \therefore \frac{15}{25}$ and $\frac{3}{5}$are equivalent fractions.

Rational Numbers in Standard Form

- A rational number is said to be in the **standard form** if its denominator is a positive integer and the **numerator and denominator have no common factor other than 1.**
- Example: Reduce $-\frac{4}{16}$.
  Here, the H.C.F. of 4 and 16 is 4.

  $\Rightarrow -\frac{4}{16} = \frac{-\frac{4}{4}}{\frac{16}{4}} \Rightarrow -\frac{4}{16} = \quad -\frac{1}{4}$ is the standard form of $-\frac{4}{16}$.

LCM

- The least common multiple (LCM) of two numbers is the smallest number (≠0) that is a multiple of both.

- Example: LCM of 3 and 4 can be calculated as shown below:
  Multiples of 3: 0, 3, 6, 9, **12**,15
  Multiples of 4: 0, 4, 8, **12**, 16
  LCM of 3 and 4 is 12.

Rational Numbers Between 2 Rational Numbers

Rational Numbers between Two Rational Numbers

- There are unlimited number(infinite number) of rational numbers between any two rational numbers.
- Example: List some of the rational numbers between $-3/5$ and $-1/3$.
  Solution: L.C.M. of 5 and 3 is 15.
  ⇒ The given equations can be written as $-9/15$ and $-5/15$.
  ⇒$-6/15, -7/15, -8/15$ are the rational numbers between $-3/5$ and $-1/3$.

Note : These are only few of the rational numbers between $-3/5$ and $-1/3$. There are infinte number of rational numbers between them. Following the same procedure, many more rational numbers can be inserted between them.

Properties of Rational Numbers

Properties of Rational Numbers

- **Closure Property**
  Sum, difference and product of two rationals is again a rational number. So, Rational numbers are closed under addition, subtraction, multiplication but **NOT** under division.

- **Commutativity Property**
  For any two rational numbers a and b $a*b=b*a$.
- Rational numbers are commutative under addition and multiplication but **NOT** under subtraction and division.
  Example: $\frac{1}{7}+\frac{3}{7}=\frac{4}{7}$ and $\frac{3}{7}+\frac{1}{7}=\frac{4}{7}$
  $\frac{2}{3}\times\frac{5}{6}=\frac{10}{18}=\frac{5}{9}$ and $\frac{5}{6}\times\frac{2}{3}=\frac{5}{9}$
  $\frac{1}{2}-\frac{3}{4}=-\frac{1}{4}$ but $\frac{3}{4}-\frac{1}{2}=\frac{1}{4}$
  $\frac{3}{7}\div\frac{5}{2}=\frac{6}{35}$ but $\frac{5}{2}\div\frac{3}{7}=\frac{35}{6}$

- **Associative Property**
  For any three rational numbers a, b and c, $(a*b)*c=a*(b*c)$.
- Addition and multiplication are associative for rational numbers, but subtraction and division are **NOT** associative for rational numbers.

Example: $\left(\frac{1}{5}+\frac{2}{7}\right)+\frac{1}{3}=\frac{86}{105}$ and $\frac{1}{5}+\left(\frac{2}{7}+\frac{1}{3}\right)=\frac{86}{105}$

$\left(\frac{3}{8}\times\frac{1}{9}\right)\times\frac{5}{7}=\frac{15}{504}$ and $\frac{3}{8}\times\left(\frac{1}{9}\times\frac{5}{7}\right)=\frac{15}{504}$

$\left(\frac{4}{9}-\frac{3}{2}\right)-\frac{1}{3}=\frac{93}{57}$ but $\frac{4}{9}-\left(\frac{3}{2}-\frac{1}{3}\right)=\frac{39}{54}$

$\left(\frac{3}{5}\div\frac{2}{5}\right)\div\frac{2}{5}=\frac{15}{4}$ but $\frac{3}{5}\div\left(\frac{2}{5}\div\frac{2}{5}\right)=\frac{3}{5}$

Addition of Rational Numbers

- **Case 1:** Adding rational numbers with same denominators:

  Example : $\frac{19}{5}+\frac{-7}{5}$

  $=\left(\frac{19-7}{5}\right)=\frac{12}{5}$
- **Case 2:** Adding rational numbers with different denominators:

  Example : $\frac{-3}{7}+\frac{2}{3}$

  LCM of 7 and 3 is 21

  So, $\frac{-3}{7}=\frac{-9}{21}$ and $\frac{2}{3}=\frac{14}{21}$

  $\Rightarrow \frac{-9}{21}+\frac{14}{21}=\left(\frac{-9+14}{21}\right)=\frac{5}{21}$

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Subtraction of Rational Numbers

- To subtract two rational numbers, add the additive inverse of the rational number that is being subtracted, to the other rational number.
- Example: Subtract $\frac{2}{5}$ from $\frac{7}{9}$.

  $\frac{7}{9}$+ Additive Inverse of $\left(\frac{2}{5}\right)$

  $=\frac{7}{9}+\left(\frac{-2}{5}\right)$

  $=\left(\frac{35-18}{45}\right)$ {$\because$ LCM of 9 and 5 is 45}

  $=\frac{17}{45}$

Multiplication and Division of Rational Numbers

Multiplication of Rational Numbers

Multiplication of Rational Numbers

- **Case 1:** To multiply a rational number by a positive integer, multiply the numerator by that integer, keeping the denominator unchanged.
$$\frac{-3}{5} \times (7) = \frac{-3 \times 7}{5} = \frac{-21}{5}$$
- **Case 2:** Steps to multiply one rational number by the other rational number:
Step 1: Multiply the numerators of the two rational numbers.
Step 2: Multiply the denominators of the two rational numbers.
Step 3: Write the product as
$$\frac{\textit{Product of Numerators}}{\textit{Product of Denominators}}$$
$$= \left(\frac{-5}{7}\right) \times \left(\frac{-9}{8}\right) = \frac{-5 \times (-9)}{7 \times 8} = \frac{45}{56}$$

Division of rational numbers

- To divide one rational number by the other rational numbers we multiply the rational number by the reciprocal of the other.
Example: $\frac{-2}{3} \div \frac{1}{7}$
$$= \frac{-2}{3} \times \text{Reciprocal of } \frac{1}{7}$$
$$= \frac{-2}{3} \times 7 \quad \{\because \text{Reciprocal of } \frac{1}{7} = 7\}$$
$$= \frac{-14}{3}$$

Negatives and Reciprocals

Negatives and Reciprocals

- Rational numbers are classified as positive and negative rational numbers.
  (i) When both the numerator and denominator of a rational number are **positive integers or negative integers**, then it is a positive rational number.

  Example: $\frac{3}{5}$ is a positive rational number. $\frac{-3}{-5} = \frac{3}{5}$ is also a positive rational number.

  (ii) When either numerator or denominator of a rational number is a **negative integer**, it is a negative rational number.

  Example: $\frac{-3}{5} = -\frac{3}{5}$ is a negative rational number. $\frac{3}{-5} = -\frac{3}{5}$ is lso a negative rational number.

- If the product of two rational numbers is 1 then they are called **reciprocals** of each other.
  Example : $\frac{2}{3}$ is reciprocal of $\frac{3}{2}$, since $\frac{2}{3} \times \frac{3}{2} = 1$

  Note : The product of a rational number with its reciprocal is always 1.

Additive Inverse of a Rational Number

- Additive Inverse of a rational number $\frac{p}{q}$ is the number that, when added to $\frac{p}{q}$, yields zero.
  Example: Additive Inverse of a rational number $\frac{3}{5}$ is $\frac{-3}{5}$ and addtive inverse of $\frac{-3}{5}$ is $\frac{3}{5}$.
  Since $\frac{3}{5} + \frac{-3}{5} = 0$

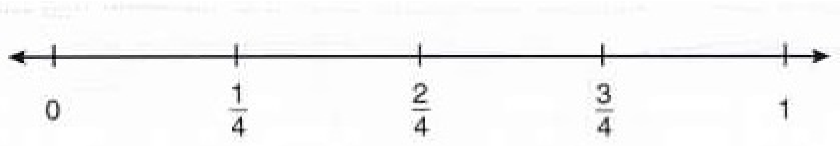
Representing on a Number Line

Rational Numbers on a Number Line

- In order to represent a given rational number $\frac{a}{n}$, where a and n are integers, on the number line :

  Step 1 : Divide the distance between two consecutive integers into n parts.
  For example : If we are given a rational number $\frac{3}{4}$, we divide the space between 0 and 1, 1 and 2 etc. into **four** parts
  Step 2: Label the rational numbers till the range includes the number you need to mark

- The following figure shows how fractions $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ are represented on a number line.
- Divide the portion from 0 to 1 on the number line into four parts.
  Then each part represents $\frac{1}{4}^{th}$ portion of the whole.



Comparison of Rational Numbers

- **Case 1:** To compare two negative rational numbers, ignore their negative signs and reverse the order.
  Example: Which is greater: $\frac{-3}{8}$ or $\frac{-2}{7}$?
  Compare $\frac{3}{8}$ and $\frac{2}{7}$: $\frac{3}{8} > \frac{2}{7}$
  $\therefore \frac{-3}{8} < \frac{-2}{7}$
- **Case 2:** To compare a negative and a positive rational number, we consider that a negative rational number is to the left of zero whereas a positive rational number is to the right of zero on a number line. So, a negative rational number will always be less than a positive rational number.
  Example: (i) $\frac{-3}{11} < \frac{2}{5}$
  (ii) $\frac{-3}{8} < \frac{-2}{7}$

Solved Numericals

Multiple Choice Questions (MCQs)

Question 1:
A rational number is defined as a number that can be expressed in the form p/q, where p and q are integers and
(a) $q = 0$ (b) $q = 1$
(c) $q \neq 1$ (d) $q \neq 0$
Solution :
(d) By definition, a number that can be expressed in the form of p/q, where p and q are integers and $q \neq 0$, is called a rational number.

Question 2:
Which of the following rational numbers is positive?

(a) $\frac{-8}{7}$ (b) $\frac{19}{-13}$
(c) $\frac{-3}{-4}$ (d) $\frac{-21}{13}$

Solution :
(c) We know that, when numerator and denominator of a rational number, both are negative, it is a positive rational number.
Hence, among the given rational numbers $\left(\frac{-3}{-4}\right)$ is positive.

Question 3:
Which of the following rational numbers is negative?
(a) $-\left(\frac{-3}{7}\right)$ (b) $\frac{-5}{-8}$
(c) $\frac{9}{8}$ (d) $\frac{3}{-7}$

Solution :
(d)
(a) $-\left(\frac{-3}{7}\right) = \frac{3}{7}$ (b) $\frac{-5}{-8} = \frac{5}{8}$ (c) $\frac{9}{8} = \frac{9}{8}$ (d) $\frac{3}{-7} = \frac{-3}{7}$

Question 4:
In the standard form of a rational number, the common factor of numerator and denominator is always
(a) 0 (b) 1 c) -2 (d)2
Solution :
(b) By definition, in the standard form of a rational number, the common factor of numerator and denominator is always1
Note: Common factor means, a number which divides both the given two numbers.

Question 5:
Which of the following rational numbers is equal to its reciprocal?
(a) 1 (b) 2 c) 1/2 (d)0
Solution :
(a)

(a) Reciprocal of $1 = \frac{1}{1} = 1$

(b) Reciprocal of $2 = \frac{1}{2}$

(c) Reciprocal of $\frac{1}{2} = \frac{1}{\frac{1}{2}} = 2$

(d) Reciprocal of $0 = \frac{1}{0}$

***Note** 1 is the only number, which is equal to its reciprocal.*

Question 6:
The reciprocal of 1/2 is
(a) 3 (b) 2 c) -1 (d)0
Solution :
(b) Reciprocal of $\frac{1}{2} = \frac{1}{\frac{1}{2}}$ =2

Question 7:
The standard form of $\frac{-48}{60}$ is

(a) $\frac{48}{60}$ (b) $\frac{-60}{48}$ (c) $\frac{-4}{5}$ (d) $\frac{-4}{-5}$

Solution :
(c) Given rational number is $\frac{-48}{60}$.

For standard/simplest form, divide numerator and denominator by their HCF

i.e. $\frac{-48 \div 12}{60 \div 12} = \frac{-4}{5}$ [$\because$ HCF of 48 and 60 = 12]

Hence, the standard form of $\frac{-48}{60}$ is $\frac{-4}{5}$.

Question 8:
Which of the following is equivalent to 4/5 ?

(a) $\frac{5}{4}$ (b) $\frac{16}{25}$

(c) $\frac{16}{20}$ (d) $\frac{15}{25}$

Solution :

(c) Given rational number is $\frac{4}{5}$.

So, equivalent rational number $= \frac{4 \times 4}{5 \times 4}$

$= \frac{16}{20}$ [multiplying numerator and denominator by 4]

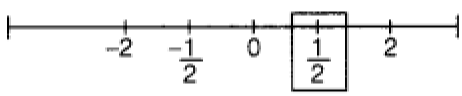
Note: If the numerator and denominator of a rational number is multiplied/divided by a non-zero integer, then the result we get, is equivalent rational number.

Question 9:
How many rational numbers are there between two rational numbers?
(a) 1 (b) 0
(c) unlimited (d) 100
Solution :
(c) There are unlimited numbers between two rational numbers.

Question 10:
In the standard form of a rational number, the denominator is always a
(a) 0 (b) negative integer
(c) positive integer (d) 1
Solution :
(c) By definition, a rational number is said to be in the standard form, if its denominator is a positive integer.

Question 11:
To reduce a rational number to its standard form, we divide its numerator and denominator by their
(a) LCM (b) HCF
(c) product (d) multiple
Solution :
(b) To reduce a rational number to its standard form, we divide its numerator and denominator by their HCF.

Question 12:
Which is greater number in the following?
(a) $-\frac{1}{2}$ (b) 0 (c) $\frac{1}{2}$ (d)-2
Solution :
(c) Obviously, $\frac{1}{2}$ is greater, since this is the only number which is on the rightmost side of the number line among others.



Fill in the Blanks

In questions 13 to 46, fill in the blanks to make the statements true.

Question 13:
$\frac{-3}{8}$ is a rational number
Solution :
The given rational number $\frac{-3}{8}$ is a negative number, because its numerator is negative integer.
Hence, $\frac{-3}{8}$ is a negative rational number.

Question 14:
is a____rational number.
Solution :
The given rational number 1 is positive number, because its numerator and denominator are positive integer.
Hence, 1 is a **positive** rational number.

Question 15:
The standard form of $\frac{-8}{36}$ is______ .
Solution :
Given rational number is $\frac{-8}{-36}$.

For standard/simplest form, $\frac{-8 \div 4}{-36 \div 4} = \frac{-2}{-9} = \frac{2}{9}$ [$\because$ HCF of 8 and 36 = 4]

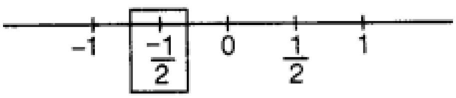
Hence, the standard form of $\frac{-8}{-36}$ is $\mathbf{\frac{2}{9}}$.

Question 16:
The standard form of $\frac{18}{-24}$ is______ .
Solution :
Given rational number is $\frac{18}{-24}$.

For standard/simplest form, $\frac{18 \div 6}{-24 \div 6} = \frac{3}{-4}$ [$\because$ HCF of 18 and 24 = 6]

Hence, the standard form of $\frac{18}{-24}$ is $\mathbf{\frac{-3}{4}}$.

Question 17:
On a number line, $\frac{-1}{2}$ is to the______of Zero(0).
Solution :
On a number line, $\frac{-1}{2}$ is to the **left** of zero (0).



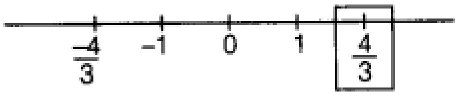
Note All the negative numbers lie on the left side of zero on the number line

Question 18:

On a number line, $\frac{3}{4}$ is to the______of Zero(0).

Solution :

On a number line, $\frac{3}{4}$ is to the **right** of Zero(0).



Note All the positive numbers lie on the right side of zero on the number line.

Question 19:

$\frac{-1}{2}$ is _____ than $\frac{1}{5}$.

Solution :

Given rational numbers are $\frac{-1}{2}$ and $\frac{1}{5}$.

LCM of their denominators, i.e. 2 and 5 = 10

$\therefore \quad \frac{-1 \times 5}{2 \times 5} = \frac{-5}{10}$ and $\frac{1 \times 2}{5 \times 2} = \frac{2}{10}$

$\because \quad 2 > -5$

So, $\quad \frac{1}{5} > \frac{-1}{2}$

Hence, $\frac{-1}{2}$ is **smaller** than $\frac{1}{5}$.

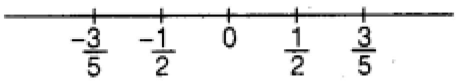
Question 20:

$\frac{-3}{5}$ is _____ than 0.

Solution :

Since, $\frac{-3}{5}$ lies on the left side of zero (0). On the number line, $\frac{-3}{5}$ is **smaller** than 0

i.e. $\frac{-3}{5} < 0$.



Question 21:

$\frac{-16}{24}$ and $\frac{20}{-16}$ represent_______ rational numbers.

Solution :

Given numbers are $\frac{-16}{24} = \frac{-4}{6} = \frac{-2}{3}$ [lowest form]

and $\frac{20}{-16} = \frac{-5}{4}$ [lowest form]

$\because \quad \frac{-16}{24} \neq \frac{20}{-16}$

Hence, $\frac{-16}{24}$ and $\frac{20}{-16}$ represent **different** rational numbers.

Question 22:
$\frac{-27}{45}$ and $\frac{-3}{5}$ represent_______ rational numbers.
Solution :
Given numbers are $\frac{-27}{45} = \frac{-9}{15} = \frac{-3}{5}$ [lowest form]
and $\frac{-3}{5}$ [already lowest form]
Hence, $\frac{-27}{45}$ and $\frac{-3}{5}$ represent **same** rational numbers.

Question 23:
Additive inverse of $\frac{2}{3}$ is_____.
Solution :
Since, additive inverse is the negative of a number.
Hence, additive inverse of $\frac{2}{3}$ is $\frac{-2}{3}$.
Note Additive inverse is a number, which when added to a given number, we get result as zero.

Question 24:
$\frac{-3}{5} + \frac{2}{5} =$ _____.
Solution :
Given, $\frac{-3}{5} + \frac{2}{5} = \frac{-3+2}{5}$ [taking LCM]
$= \frac{-1}{5}$
Hence, $\frac{-3}{5} + \frac{2}{5} = \frac{-1}{5}$.

Question 25:
$\frac{-5}{6} + \frac{-1}{6} =$ ______.
Solution :
Given, $\frac{-5}{6} + \frac{-1}{6} = \frac{-5}{6} - \frac{1}{6} = \frac{-5-1}{6}$ [taking LCM]
$= \frac{-6}{6}$
$= -1$
Hence, $\frac{-5}{6} + \frac{-1}{6} = -1$.

Question 26:
$\frac{3}{4} \times \left(\frac{-2}{3}\right) =$ _____.

Solution :

Given, $\frac{3}{4} \times \left(\frac{-2}{3}\right)$

Product of rational numbers $= \frac{\text{Product of numerators}}{\text{Product of denominators}} = \frac{3 \times (-2)}{4 \times 3} = \frac{-6}{12}$

$= \frac{-6 \div 6}{12 \div 6}$ [dividing numerator and denominator by 6]

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

Question 27:

$\frac{-5}{3} \times \left(\frac{-3}{5}\right) =$ ______.

Solution :

Given, $\frac{-5}{3} \times \left(\frac{-3}{5}\right)$

$\because$ Product of rational numbers $= \frac{\text{Product of numerators}}{\text{Product of denominators}} = \frac{(-5) \times (-3)}{3 \times 5} = \frac{15}{15} = 1$

Hence, $\frac{-5}{3} \times \left(\frac{-3}{5}\right) = 1.$

Question 28:

Given, $\frac{-6}{7} = \bar{42}$

Solution :

Let given expression is written as $\frac{-6}{7} = \frac{x}{42}$

$\Rightarrow \quad x = \frac{42 \times (-6)}{7} = 6 \times (-6)$ [by cross-multiplication]

$\Rightarrow \quad x = -36$

Hence, $\frac{-6}{7} = \frac{\mathbf{-36}}{42}.$

Question 29:

$\frac{1}{2} = \frac{6}{-}$

Solution :

Let $\frac{1}{2} = \frac{6}{x}$

$\Rightarrow \quad x = 12$ [by cross-multiplication]

Hence, $\frac{1}{2} = \frac{6}{\mathbf{12}}.$

Question 30:

$\frac{-2}{9} - \frac{7}{9} =$ ______

Solution :

Given, $\frac{-2}{9}-\frac{7}{9}=\frac{-2-7}{9}$ [taking LCM]

$=\frac{-9}{9}=-1$

Hence, $\frac{-2}{9}-\frac{7}{9}=-1$.

In questions 31 to 35, fill in the boxes with the correct symbol '<','<' or '='.

Question 31:

$\frac{7}{-8}\square\frac{8}{9}$

Solution :

Given rational numbers are $\frac{7}{-8}$ and $\frac{8}{9}$.

Since, $\frac{7}{-8}=\frac{-7}{8}$ is a negative rational number and $\frac{8}{9}$ is a positive rational number. Also, every positive rational number is greater than negative rational number.

Hence, $\frac{7}{-8}<\frac{8}{9}$.

Question 32:

$\frac{3}{7}\square\frac{-5}{6}$

Solution :

Given rational numbers are $\frac{3}{7}$ and $\frac{-5}{6}$.

Since, $\frac{-5}{6}$ is a negative rational number and $\frac{3}{7}$ is a positive rational number.

Also, every positive rational number is greater than negative rational number.

Hence, $\frac{3}{7}>\frac{-5}{6}$.

Question 33:

$\frac{5}{6}\square\frac{4}{8}$

Solution :

Given rational numbers are $\frac{5}{6}$ and $\frac{8}{4}$.

We convert the rational numbers with the same denominators.

$\therefore$ $\frac{5\times2}{6\times2}=\frac{10}{12}$ and $\frac{8\times3}{4\times3}=\frac{24}{12}$ [$\because$ LCM of 6 and 4 = 12]

i.e. $24>10 \Rightarrow \frac{24}{12}>\frac{10}{12}$

Hence, $\frac{5}{6}<\frac{8}{4}$.

Question 34:
$\frac{-9}{7} < \frac{4}{-7}$
Solution :

Given rational numbers are $\frac{-9}{7}$ and $\frac{4}{-7}$. Since, both fractions have same denominator, the fraction which have greater numerator is greater. But in a negative number, the numerator which is smaller is the greater number.

Hence, $\frac{-9}{7} < \frac{4}{-7}$.

Question 35:
$\frac{8}{8} \square \frac{2}{2}$
Solution :

Given, $\frac{8}{8} = 1$ and $\frac{2}{2} = 1$

Hence, $\frac{8}{8} = \frac{2}{2}$

Question 36:
The reciprocal of_______ does not exist.
Solution :
The reciprocal of zero does not exist, as reciprocal of 0 is 1/0, which is not defined.

Question 37:
The reciprocal of 1 is_______
Solution :
The reciprocal of 1=1/1
Hence, the reciprocal of 1 is 1.

Question 38:
$\frac{-3}{7} \div \left(\frac{-7}{3}\right) =$________
Solution :

$\because$ Reciprocal of $\frac{-7}{3}$ is $\frac{3}{-7}$.

$\therefore \quad \frac{-3}{7} \times \left(\frac{3}{-7}\right)$

Product of rational numbers $= \frac{\text{Product of numerators}}{\text{Product of denominators}} = \frac{(-3 \times 3)}{7 \times (-7)} = \frac{-9}{-49} = \frac{9}{49}$

Hence, $\frac{-3}{7} \div \left(\frac{-7}{3}\right) = \mathbf{\frac{9}{49}}$.

Question 39:
$0 \div \left(\frac{-5}{6}\right) =$_________

Solution :

Here, $0 \div \left(\frac{-5}{6}\right) = \mathbf{0}$

Because, 0 divided by any number is zero.

Question 40:

$0 \times \left(\frac{-5}{6}\right)$ =__________

Solution :

Hence, $0 \times \left(\frac{-5}{6}\right)$ =0

Because, zero multiplies by any number result is zero.

Question 41:

______ x $\left(\frac{-2}{5}\right)$ =1

Solution :

Let $x \times \left(\frac{-2}{5}\right) = 1$

$\Rightarrow \frac{-2x}{5} = 1$

$\Rightarrow -2x = 5$ [by cross-multiplication]

$\Rightarrow x = \frac{-5}{2}$

Hence, $\frac{-5}{2} \times \left(\frac{-2}{5}\right) = 1$

Question 42:

The standard form of rational number – 1 is________.

Solution :

∴ HCF of given rational number -1 is 1.

For standard form = -1 +1 = -1

Hence, the standard form of rational number -1 is -1.

Question 43:

If m is a common divisor of a and b, then $\frac{a}{b} = \frac{a+m}{-}$

Solution :

If m is a common divisor of a and b, then

$$\frac{a}{b} = \frac{a+m}{b+m}$$

Question 44:

If p and q are positive integers, then $\frac{p}{q}$ is a_______ rational number and $\frac{p}{-q}$ is a______ rational number.

Solution :

if p and q are positive integers, then p/q is a **positive** rational number, because both numerator and denominator are positive and $\frac{p}{-q}$ is a **negative** rational number, because denominator is in negative

Question 45:
Two rational numbers are said to be equivalent or equal, if they have the same_______form.
Solution :
Two rational numbers are said to be equivalent or equal, if they have the same **simplest** form.

Question 46:
If p/q is a rational number, then q cannot be_____________
Solution :
By definition, if B is a rational number, then q cannot be **zero**.

True/False

In questions 47 to 65, state whether the following statements are True or False.

Question 47:
Every natural number is a rational number, but every rational number need not be a natural number.
Solution :
True
e.g. 1/2 is a rational number, but not a natural number.

Question 48:
Zero is a rational number.
Solution :
True
e.g. Zero can be written as 0 = 0/1. We know that, a number of the form $\frac{p}{q}$, where p, q are integers and q ≠ 0 is a rational number. So, zero is a rational number.

Question 49:
Every integer is a rational number but every rational number need not be an integer.
Solution :
True
Integers…. – 3,-2,-1, 0,1,2, 3,…
Rational numbers:
$1, \frac{-1}{2}, 0, \frac{1}{2} 1, \frac{3}{2},$……
Hence, every integer is rational number, but every rational number is not an integer.

Question 50:
Every negative integer is not a negative rational number.
Solution :
False
Because all the integers are rational numbers, whether it is negative/positive but vice-versa is not true.

Question 51:
If $\frac{p}{q}$ is a rational number and m is a non-zero integer, then

$\frac{p}{q} = \frac{p \times m}{q \times m}$

Solution :

True

e.g. Let m = 1,2, 3,…

When $m = 1$, then $\frac{p}{q} = \frac{p \times 1}{1 \times q} = \frac{p}{q}$

When $m = 2$, then $\frac{p}{q} = \frac{p \times 2}{q \times 2} = \frac{p}{q}$

Hence, $\frac{p}{q} = \frac{p \times m}{q \times m}$

Note: *When both* numerator and denominator of a rational number are multiplied/divide by a same non-zero number, then we get the same rational number

Question 52:

If $\frac{p}{q}$ is a rational number and m is a non-zero common divisor of p and q, then $\frac{p}{q} = \frac{p \div m}{q \div m}$

Solution :

True

e.g. Let $m = 1, 2, 3, \ldots$

When $m = 1$, then $\frac{p}{q} = \frac{p + 1}{q + 1} = \frac{p}{1} + \frac{q}{1} = \frac{p}{1} \times \frac{1}{q} = \frac{p}{q}$

When $m = 2$, then $\frac{p}{q} = \frac{p + 2}{q + 2} = \frac{p}{2} + \frac{q}{2} = \frac{p}{2} \times \frac{2}{q} = \frac{p}{q}$

Hence, $\frac{p}{q} = \frac{p + m}{q + m}$

Question 53:

In a rational number, denominator always has to be a non-zero integer.

Solution :

Basic definition of the rational number is that, it is in the form of $\frac{p}{q}$, where $q \neq 0$. It is because any number divided by zero is not defined.

Question 54:

If $\frac{p}{q}$ is a rational number and m is a non-zero integer, then $\frac{p \times m}{q \times m}$ is a rational number not equivalent to $\frac{p}{q}$.

Solution :

False

Let $m = 1, 2, 3, \ldots$

When $m = 1$, then $\frac{p \times m}{q \times m} = \frac{p \times 1}{q \times 1} = \frac{p}{q}$

when $m = 2$, then $\frac{p \times m}{q \times m} = \frac{p \times 2}{q \times 2} = \frac{p}{q}$

For any non-zero value of m, $\frac{p \times m}{q \times m}$ is always equivalent to $\frac{p}{q}$.

Question 55:
Sum of two rational numbers is always a rational number.
Solution :
True
Sum of two rational numbers is always a rational number, it is true.
$\frac{1}{2}+\frac{2}{3}=\frac{3+4}{6}=\frac{7}{6}$

Question 56:
All decimal numbers are also rational numbers.
Solution
True
All decimal numbers are also rational numbers, it is true.
$0.6=\frac{6}{10}=\frac{3}{5}$

Question 57:
The quotient of two rationals is always a rational number.
Solution :
False
The quotient of two rationals is not always a rational number.
e.g. 1/0.

Question 58:
Every fraction is a rational number.
Solution :
True
Every fraction is a rational number but vice-versa is not true.

Question 59:
Two rationals with different numerators can never be equal.
Solution :
False
Let $\frac{2}{3}$ and $\frac{4}{6}$ be two rational numbers, then $\frac{4}{6}$ can be written as $\frac{2}{3}$ in its lowest form.
$\because \frac{4}{6}=\frac{4\div 2}{6\div 2}=\frac{4}{2}\div\frac{6}{2}=\frac{2}{3}$
Hence, two rational numbers with different numerators can be equal.

Question 60:
8 can be written as a rational number with any integer as denominator.
Solution :
8 can be written as a rational number with any integer as denominator, it is false because 8 can be written as a rational number with 1 as denominator i.e.8/1.

Question 61:
$\frac{4}{6}$ is equivalent to $\frac{2}{3}$
Solution :

True

Given, $\frac{4}{6} = \frac{4 \div 2}{6 \div 2} = \frac{2}{3}$

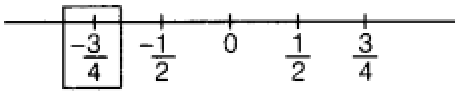
Question 62:

The rational number $\frac{-3}{4}$ lies to the right of zero on the number line.

Solution :

False

Because every negative rational number lies to the left of zero on the number line.



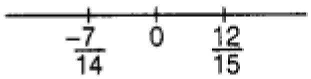
Question 63:

The rational number $\frac{-12}{15}$ and $\frac{-7}{17}$ are on the opposite sides of zero on the number line.

Solution :

Given rational numbers are $\frac{-12}{-15}$ i.e. $\frac{12}{15}$ and $\frac{-7}{17}$.

Hence, it is true, that rational numbers $\frac{12}{15}$ and $\frac{-7}{17}$ are on the opposite sides of zero on the number line as one is negative and one is positve.



Question 64:

Every rational number is a whole number.

Solution :

False

e.g. $\frac{-7}{8}$ is a rational number, but it is not a whole number, because whole numbers are 0,1,2….

Question 65:

Zero is the smallest rational number.

Solution :

False

Rational numbers can be negative and negative rational numbers are smaller than zero.

Question 66:

Match the following:

	Column I		Column II
(i)	$\frac{a}{b}+\frac{a}{b}$	(a)	$\frac{-a}{b}$
(ii)	$\frac{a}{b}+\frac{c}{d}$	(b)	-1
(iii)	$\frac{a}{b}+(-1)$	(c)	1
(iv)	$\frac{a}{b}+\frac{-a}{b}$	(d)	$\frac{bc}{ad}$
(v)	$\frac{b}{a}+\left(\frac{d}{c}\right)$	(e)	$\frac{ad}{bc}$

Solution :

(i) $\leftrightarrow$ (c)

Given, $\frac{a}{b}+\frac{a}{b}=\frac{a}{b}\times\frac{b}{a}$ $\left[\because \text{ Reciprocal of } \frac{a}{b}=\frac{b}{a}\right]$

$=1$

(ii) $\leftrightarrow$ (e)

Given, $\frac{a}{b}+\frac{c}{d}=\frac{a}{b}\times\frac{d}{c}$ $\left[\because \text{ Reciprocal of } \frac{c}{d}=\frac{d}{c}\right]$

$=\frac{ad}{bc}$

(iii) $\leftrightarrow$ (a)

Given, $\frac{a}{b}+(-1)=\frac{a}{b}\times(-1)$ $[\because \text{Reciprocal of } -1=-1]$

$=\frac{-a}{b}$

(iv) $\leftrightarrow$ (b)

Given, $\frac{a}{b}+\frac{-a}{b}=\frac{a}{b}\times\left(\frac{-b}{a}\right)$ $\left[\because \text{ Reciprocal of } \frac{-a}{b}=\frac{-b}{a}\right]$

$=-1$

(v) $\leftrightarrow$ (d)

Given, $\frac{b}{a}+\left(\frac{d}{c}\right)=\frac{b}{a}\times\frac{c}{d}$ $\left[\because \text{ Reciprocal of } \frac{d}{c}=\frac{c}{d}\right]$

$=\frac{bc}{ad}$

Question 67:

Write each of the following rational numbers with positive denominators.

$\frac{5}{-8}, +\frac{15}{28} \frac{-17}{13}$

Solution :

We can write, $\frac{5}{-8} = \frac{5 \times (-1)}{-8 \times (-1)} = \frac{-5}{8}$ [multiplying numerators and denominators by (-1)]

$\frac{15}{-28}$ can be written as $= \frac{15 \times (-1)}{-28 \times (-1)} = \frac{-15}{28}$

and $\frac{-17}{-13}$ can be written as $= \frac{-17 \times (-1)}{-13 \times (-1)} = \frac{17}{13}$, as both negative signs are cancelled.

Question 68:

Express $\frac{3}{4}$ as a rational number with denominator:

(a)36 (b) — 80

Solution :

(a) To make the denominator 36, we have to multiply numerator and denominator by 9.

$\therefore \qquad \frac{3 \times 9}{4 \times 9} = \frac{27}{36}$

(b) To make the denominator -80, we have to multiply numerator and denominator by -20.

$\therefore \qquad \frac{3 \times (-20)}{4 \times (-20)} = \frac{-60}{-80}$

Question 69:

Reduce each of the following rational numbers in its lowest form

(i) $\frac{-60}{72}$

(ii) $\frac{91}{-364}$

Solution :

(i) $\frac{-60}{72}$ can be written as

$= \frac{-60 + 12}{72 + 12}$ [dividing numerator and denominator by HCF of 60 and 72 i.e. 12]

$= \frac{-60 \times \frac{1}{12}}{72 \times \frac{1}{12}}$ $\left[\because \text{Reciprocal of } 12 = \frac{1}{12}\right]$

$= \frac{-5}{6}$, which is the lowest form.

(ii) $\frac{91}{-364}$ can be written as

$= \frac{91 \div 91}{-364 \div 91}$ [dividing numerator and denominator by HCF of 91 and 364 i.e., 91]

$= \frac{91 \times \frac{1}{91}}{-364 \times \frac{1}{91}}$ $\left[\because \text{Reciprocal of } 91 = \frac{1}{91}\right]$

$= -\frac{1}{4}$, which is the lowest form.

Question 70:

Express each of the following rational numbers in its standard form

(i) $\frac{-12}{-30}$ (ii) $\frac{14}{-49}$

(iii) $\frac{-15}{35}$ (iv) $\frac{299}{-161}$

Solution :

(i) Given rational number is $\frac{-12}{-30}$.

For standard form of given rational number $= \frac{-12 \div 6}{-30 \div 6}$ [$\because$ HCF of 12 and 30 = 6]

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

Hence, the standard form of $\frac{-12}{-30}$ is $\frac{2}{5}$.

(ii) Given rational number is $\frac{14}{-49}$.

For standard form of given rational number $= \frac{14 \div 7}{-49 \div 7}$ [$\because$ HCF of 14 and 49 = 7]

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

Hence, the standard form of $\frac{14}{-49}$ is $\frac{-2}{7}$.

(iii) Given rational number is $\frac{-15}{35}$.

For standard form of given rational number $= \frac{-15 \div 5}{35 \div 5}$ [$\because$ HCF of 15 and 35 = 5]

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

Hence, the standard form of $\frac{-15}{35}$ is $\frac{-3}{7}$.

(iv) Given rational number is $\frac{299}{-161}$.

For standard form of given rational number $= \frac{299 \div 23}{-161 \div 23}$ [$\because$ HCF of 299 and 61 = 23]

$= \frac{13}{-7} = \frac{13 \div (-1)}{13 \div (-1)}$ [dividing by (−1) in both numerator and denominator]

$= \frac{-13}{7}$

Hence, the standard form of $\frac{299}{-161}$ is $\frac{-13}{7}$.

Question 71:

Are the rational numbers $\frac{-8}{28}$ and $\frac{32}{-12}$ equivalent? Give reason.

Solution :

Given rational numbers are $\frac{-8}{28}$ and $\frac{32}{-112}$.

For standard form of $\frac{-8}{28} = \frac{-8+4}{28+4} = \frac{-2}{7}$ [∵ HCF of 8 and 28 = 4]

and standard form of $\frac{32}{-112} = \frac{32+16}{-112+16}$ [∵ HCF of 32 and 112 = 16]

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

Yes

Since, the standard form of $\frac{-8}{28}$ and $\frac{32}{-112}$ are equal.

Hence, they are equivalent.

Question 72:

Arrange the rational numbers $\frac{-7}{10}, \frac{5}{-8}, \frac{2}{-3}, \frac{-1}{4}, \frac{-3}{5}$ in ascending order.

Solution :

Given rational numbers are $\frac{-7}{10}, \frac{5}{-8}, \frac{2}{-3}, \frac{-1}{4}, \frac{-3}{5}$.

To arrange in any order, we make denominators of all rational numbers as same.

∴ LCM of 10, 8, 3, 4 and 5 is 120.

So, $\frac{-7\times 12}{10\times 12}, \frac{5\times 15}{-8\times 15}, \frac{2\times 40}{-3\times 40}, \frac{-1\times 30}{4\times 30}, \frac{-3\times 24}{5\times 24}$

$= \frac{-84}{120}, \frac{75}{-120}, \frac{80}{-120}, \frac{-30}{120}, \frac{-72}{120}$

$= \frac{-84}{120}, \frac{-75}{120}, \frac{-80}{120}, \frac{-30}{120}, \frac{-72}{120}$

Since, denominators are same, so ascending order of numerators are – 84, – 80, – 75, – 72, – 30.

Hence, $\frac{-84}{120} < \frac{-80}{120} < \frac{-75}{120} < \frac{-72}{120} < \frac{-30}{120}$

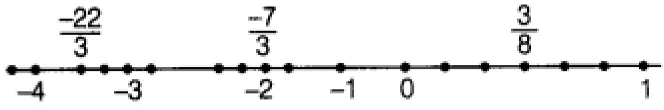
i.e. $\frac{-7}{10} < \frac{2}{-3} < \frac{5}{-8} < \frac{-3}{5} < \frac{-1}{4}$

Question 73:

Represent the following rational numbers on a number line.

$\frac{3}{8}, \frac{-7}{3}, \frac{22}{-6}$

Solution :



Question 74:

If $\frac{-5}{7} = \frac{x}{28}$ find the value of x.

Solution :

Given, $\frac{-5}{7} = \frac{x}{28}$

$\Rightarrow \quad 7 \times x = -5 \times 28$ [by cross-multiplication]

$\Rightarrow \quad x = -\frac{5 \times 28}{7} = -5 \times 4$

$\Rightarrow \quad x = -20$

Hence, the value of x is -20.

Question 75:

Give three rational numbers equivalent to

(i) $\frac{-3}{4}$

(ii) $\frac{7}{11}$

Solution :

(i) Given rational number is $\frac{-3}{4}$.

So, the equivalent rational numbers are

$$\frac{-3 \times 2}{4 \times 2} = \frac{-6}{8}, \frac{-3 \times 3}{4 \times 3} = \frac{-9}{12} \text{ and } \frac{-3 \times 4}{4 \times 4} = \frac{-12}{16}$$

Hence, three equivalent rational numbers are $\frac{-6}{8}, \frac{-9}{12}$ and $\frac{-12}{16}$.

(ii) Given rational number is $\frac{7}{11}$.

So, the equivalent rational numbers are

$$\frac{7 \times 2}{11 \times 2} = \frac{14}{22}, \frac{7 \times 3}{11 \times 3} = \frac{21}{33} \text{ and } \frac{7 \times 4}{11 \times 4} = \frac{28}{44}$$

Hence, three equivalent rational numbers are $\frac{14}{22}, \frac{21}{23}$ and $\frac{28}{44}$.

Question 76:

Write the next three rational numbers to complete the pattern:

(i) $\frac{4}{-5}, \frac{8}{-10}, \frac{12}{-15}, \frac{16}{-20}$, ___ , ___ , ___

(ii) $\frac{-8}{7}, \frac{-16}{14}, \frac{-24}{21}, \frac{-32}{28}$, ___ , ___ , ___

Solution :

(i) Given rational number is $\frac{4}{-5}$.

So, the next three equivalent rational numbers are

$$\frac{4\times 5}{-5\times 5}=\frac{20}{-25},\ \frac{4\times 6}{-5\times 6}=\frac{24}{-30} \text{ and } \frac{4\times 7}{-5\times 7}=\frac{28}{-35}$$

Hence, the next equivalent numbers are $\frac{20}{-25}, \frac{24}{-30}, \frac{28}{-35}$.

(ii) Given rational number is $\frac{-8}{7}$.

So, the next three equivalent rational numbers are

$$\frac{-8\times 5}{7\times 5}=\frac{-40}{35},\ \frac{-8\times 6}{7\times 6}=\frac{-48}{42} \text{ and } \frac{-8\times 7}{7\times 7}=\frac{-56}{49}$$

Hence, three next equivalent numbers are $\frac{-40}{35}, \frac{-48}{42}, \frac{-56}{49}$.

Question 77:

List four rational numbers between $\frac{5}{7}$ and $\frac{7}{8}$.

Solution :

Given rational numbers are $\frac{5}{7}$ and $\frac{7}{8}$.

For making the same denominators: LCM of 7 and 8 = 56.

i.e. $$\frac{5\times 8}{7\times 8}=\frac{40}{56} \text{ and } \frac{7\times 7}{8\times 7}=\frac{49}{56}$$

So, the four rational numbers between $\frac{40}{56}$ and $\frac{49}{56}$ are

$$\frac{42}{56}, \frac{44}{56}, \frac{46}{56}, \frac{48}{56}.$$

Question 78:

Find the sum of

(i) $\frac{8}{13}$ and $\frac{3}{11}$

(ii) $\frac{7}{3}$ and $\frac{-4}{3}$

Solution :

(i) Given, $\frac{8}{13}$ and $\frac{3}{11}$

$$\text{Sum}=\frac{8}{13}+\frac{3}{11}=\frac{8\times 11}{13\times 11}+\frac{3\times 13}{11\times 13}=\frac{88}{143}+\frac{39}{143} \qquad [\because \text{LCM of 13 and 11} = 143]$$

$$=\frac{88+39}{143}$$

$$=\frac{127}{143}$$

Hence, the sum of $\frac{8}{13}$ and $\frac{3}{11}$ is $\frac{127}{143}$.

(ii) Given, $\frac{7}{3}$ and $\frac{-4}{3}$

$$\text{Sum} = \frac{7}{3} + \left(-\frac{4}{3}\right)$$

$$= \frac{7}{3} - \frac{4}{3} \qquad [\because \text{LCM of 3 and } 3 = 3]$$

$$= \frac{7-4}{3} = \frac{3}{3}$$

$$= 1$$

Hence, the sum of $\frac{7}{3}$ and $\frac{-4}{3}$ is 1.

Question 79:
Solve:

(i) $\frac{29}{4} - \frac{30}{7}$ (ii) $\frac{5}{13} - \frac{-8}{26}$

Solution :

(i) Given, $\frac{29}{4} - \frac{30}{7} = \frac{29 \times 7}{4 \times 7} - \frac{30 \times 4}{7 \times 4}$

[$\because$ LCM of 4 and 7 is 28, so convert each of the given fractions to equivalent fractions with denominator 28]

$$= \frac{203}{28} - \frac{120}{28}$$

$$= \frac{203 - 120}{28} = \frac{83}{28}$$

(ii) Given, $\frac{5}{13} - \left(\frac{-8}{26}\right) = \frac{5}{13} + \frac{8}{26} = \frac{5 \times 2}{13 \times 2} + \frac{8 \times 1}{26 \times 1}$

[$\because$ LCM of 13 and 26 is 26, so convert each of the given fractions to equivalent fractions with denominator 26]

$$= \frac{10}{26} + \frac{8}{26}$$

$$= \frac{10 + 8}{26} = \frac{18}{26}$$

$$= \frac{18 \div 2}{26 \div 2} = \frac{9}{13} \qquad [\text{dividing numerator and denominator by 2}]$$

Question 80:
Find the product of

(i) $\frac{-4}{5}$ and $\frac{-5}{12}$ (ii) $\frac{-22}{11}$ and $\frac{-21}{11}$

Solution :

(i) Given, $\frac{-4}{5}$ and $\frac{-5}{12}$

$$\therefore \text{Product of rational numbers} = \frac{\text{Product of numerators}}{\text{Product of denominators}}$$

$$= \frac{(-4)\times(-5)}{5\times 12} = \frac{20}{60}$$

$$= \frac{20+20}{60+20} \quad \text{[dividing numerator and denominator by 20]}$$

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

(ii) Given, $\frac{-22}{11}$ and $\frac{-21}{11}$

$$\therefore \text{Product of rational numbers} = \frac{\text{Product of numerators}}{\text{Product of denominators}} = \frac{(-22)\times(-21)}{11\times 11} = \frac{462}{121}$$

$$= \frac{462+11}{121+11} \quad \text{[dividing numerator and denominator by 11]}$$

$$= \frac{42}{11}$$

Question 81:

Simplify:

(i) $\frac{13}{11}\times\frac{-14}{5}+\frac{13}{11}\times\frac{-7}{5}+\frac{-13}{11}\times\frac{34}{5}$

(ii) $\frac{6}{5}\times\frac{3}{7}-\frac{1}{5}\times\frac{3}{7}$

Solution :

(i) Given, $\frac{13}{11}\times\frac{-14}{5}+\frac{13}{11}\times\frac{-7}{5}+\frac{-13}{11}\times\frac{34}{5}$

$$= \frac{13\times(-14)}{11\times 5}+\frac{13\times(-7)}{11\times 5}+\frac{(-13)\times 34}{11\times 5}$$

$$= \frac{-182}{55}+\frac{(-91)}{55}+\frac{(-442)}{55}$$

$$= \frac{-182-91-442}{55} \quad \text{[taking LCM]}$$

$$= \frac{-715}{55} = -13$$

(ii) Given, $\frac{6}{5}\times\frac{3}{7}-\frac{1}{5}\times\frac{3}{7}$

$$= \frac{6\times 3}{5\times 7}-\frac{1\times 3}{5\times 7} = \frac{18}{35}-\frac{3}{35}$$

$$= \frac{18-3}{35} = \frac{15}{35} = \frac{15+5}{35+5} \quad \text{[dividing numerator and denominator by 5]}$$

$$= \frac{3}{7}$$

Question 82:
Simplify:

(i) $\frac{3}{7} \div \left(\frac{21}{-55}\right)$ (ii) $1 \div \left(-\frac{1}{2}\right)$

Solution :

(i) Given, $\frac{3}{7} \div \left(\frac{21}{-55}\right)$

The reciprocal of $\left(\frac{21}{-55}\right)$ is $\frac{-55}{21}$.

So, $\frac{3}{7} \div \left(\frac{21}{-55}\right) = \frac{3}{7} \times \frac{(-55)}{21} = \frac{(-55) \times 3}{7 \times 21} = \frac{-55}{49}$

(ii) Given, $1 \div \left(-\frac{1}{2}\right)$

The reciprocal of $\left(-\frac{1}{2}\right)$ is $\frac{2}{-1}$.

So, $1 \div \left(-\frac{1}{2}\right)\frac{1}{1} \times \frac{2}{-1} = \frac{1 \times 2}{1 \times (-1)}$

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

Question 83:
Which is greater in the following?

(i) $\frac{3}{4}, \frac{7}{8}$ (ii) $-3\frac{5}{7}, 3\frac{1}{9}$

Solution :

(i) Given rational numbers are $\frac{3}{4}$ and $\frac{7}{8}$.

Here, $\frac{3}{4} = \frac{3 \times 2}{4 \times 2} = \frac{6}{8}$ and $\frac{7}{8} = \frac{7 \times 1}{8 \times 1} = \frac{7}{8}$ [$\because$ LCM of 4 and 8 = 8]

$\because$ $7 > 6$ [since, the denominators of both rational numbers are same]

So, $\frac{7}{8} > \frac{3}{4}$

Hence, the greater number is $\frac{7}{8}$.

(ii) Given rational numbers are $-3\frac{5}{7}$ and $3\frac{1}{9}$.

Here, $-3\frac{5}{7} = -\frac{[(3) \times 7 + 5]}{7} = \frac{-[(21) + 5]}{7} = \frac{-26}{7}$

Also, $3\frac{1}{9} = \frac{\{3 \times 9 + 1\}}{9} = \frac{\{27 + 1\}}{9} = \frac{28}{9}$

So, the rational numbers can be written as $\frac{-26}{7}$ and $\frac{28}{9}$.

$\frac{-26}{7} = \frac{-26 \times 9}{7 \times 9} = -\frac{234}{63}$ and $\frac{28}{9} = \frac{28 \times 7}{9 \times 7} = \frac{196}{63}$ [$\because$ LCM of 7 and 9 = 63]

$\therefore$ 196 > − 234 [since, the denominators of both rational numbers are same]

So, $3\frac{1}{9} > -3\frac{5}{7}$

Hence, the greater number is $3\frac{1}{9}$.

Question 84:

Write a rational number in which the numerator is less than '-7 x 11′ and the denominator is greater than '12+ 4'.

Solution :

Let, $-7 \times 11 = p = -77$

and $12 + 4 = q = 16$

Rational number $= \frac{p}{q} = \frac{-77}{16}$

Hence, it has more than one answer like $\frac{-78}{17}, \frac{-79}{18}, \frac{-80}{19}$.

Question 85:

If x = $\frac{1}{10}$ and y = $\frac{-3}{8}$, then evaluate x + y, x-y, xxy and x ÷ y.

Solution :

Given, $x = \frac{1}{10}$ and $y = \frac{-3}{8}$

Now,
$$x + y = \frac{1}{10} + \frac{(-3)}{8} = \frac{1}{10} - \frac{3}{8}$$
$$= \frac{1 \times 4}{10 \times 4} - \frac{3 \times 5}{8 \times 5} \quad [\because \text{LCM of 10 and 8} = 40]$$
$$= \frac{4}{40} - \frac{15}{40} = \frac{4 - 15}{40}$$
$$= -\frac{11}{40}$$

and
$$x - y = \frac{1}{10} - \left(-\frac{3}{8}\right) = \frac{1}{10} + \frac{3}{8}$$
$$= \frac{1 \times 4}{10 \times 4} + \frac{3 \times 5}{8 \times 5} \quad [\because \text{LCM of 10 and 8} = 40]$$
$$= \frac{4}{40} + \frac{15}{40} = \frac{4 + 15}{40}$$
$$= \frac{19}{40}$$

$\therefore$ Product of rational numbers $= \frac{\text{Product of numerators}}{\text{Product of denominators}}$

$$\Rightarrow \quad x \times y = \frac{1}{10} \times \frac{(-3)}{8} = \frac{1 \times (-3)}{10 \times 8} = \frac{-3}{80}$$

and
$$x + y = \frac{1}{10} \div \left(\frac{-3}{8}\right)$$

The reciprocal of $\left(\frac{-3}{8}\right)$ is $\frac{8}{-3}$.

So,
$$x + y = \frac{1}{10} \times \frac{8}{-3}$$
$$= \frac{1 \times 8}{10 \times -3} = \frac{-8}{30} = \frac{-8 \div 2}{30 \div 2} \quad [\text{dividing numerator and denominator by 2}]$$
$$= \frac{-4}{15}$$

Question 86:

Find the reciprocal of the following:

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

(ii) $\frac{20}{51} \times \frac{4}{91}$

(iii) $\frac{3}{13} \div \frac{-4}{65}$

(iv) $\left(-5 \times \frac{12}{15}\right) - \left(-3 \times \frac{2}{9}\right)$

Solution :

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

$= \frac{1\times 1}{2\times 4}+\frac{1\times 6}{2\times 1}=\frac{1}{8}+\frac{6}{2}$ $\left[\because \text{product of rational numbers} = \frac{\text{prodcut of numerators}}{\text{prodcut of denominators}}\right]$

$= \frac{1\times 1}{8\times 1}+\frac{6\times 4}{2\times 4}$ $[\because \text{LCM of 8 and } 2 = 8]$

$= \frac{1}{8}+\frac{24}{8}=\frac{1+24}{8}$

$= \frac{25}{8}$

Hence, the reciprocal of $\frac{25}{8}$ is $\frac{8}{25}$.

(ii) Given, $\frac{20}{51}\times\frac{4}{91}$

$= \frac{20\times 4}{51\times 91}$ $\left[\because \text{product of rational numbers} = \frac{\text{product of numerators}}{\text{product of denominators}}\right]$

$= \frac{80}{4641}$

Hence, the reciprocal of $\frac{80}{4641}$ is $\frac{4641}{80}$.

(iii) Given, $\frac{3}{13}+\frac{-4}{65}$

The reciprocal of $\frac{-4}{65}$ is $\frac{65}{-4}$.

$\therefore\ \frac{3}{13}\div\frac{-4}{65}=\frac{3}{13}\times\frac{65}{-4}=\frac{65\times 3}{13\times(-4)}=\frac{15}{-4}$

Hence, the reciprocal of $\frac{15}{-4}$ is $\frac{-4}{15}$.

(iv) Given, $\left(-5\times\frac{12}{15}\right)-\left(-3\times\frac{2}{9}\right)=\left(-\frac{12}{3}\right)-\left(-\frac{2}{3}\right)$

$= -\frac{12}{3}+\frac{2}{3}=\frac{-12+2}{3}=-\frac{10}{3}$

Hence, the reciprocal of $-\frac{10}{3}$ is $-\frac{3}{10}$.

Question 87:

Write each of the following numbers in the form p/q, where p and q are integers.

(a) six-eighths (b) three and half

(c) opposite of 1 (d) one-fourth

(e) zero (f) opposite of three-fifths

Solution :

(a) Six-eighths $= \frac{6}{8}$

(b) Three and half $= 3\frac{1}{2} = \frac{3 \times 2 + 1}{2} = \frac{7}{2}$

(c) Opposite of 1 $= \frac{1}{1}$

(d) One-fourth $= \frac{1}{4}$

(e) $0 = \frac{0}{1}$

(f) Here, three-fifths $= \frac{3}{5}$

$\therefore$ Opposite of three-fifths $= \frac{5}{3}$

Question 88:
In each of the following cases, write the rational number whose numerator and denominator are respectively as under:

(a) 5-39 and 54-6 (b) (- 4) x 6 and 8 ÷ 2
(c) 35 ÷ (- 7) and 35 -18 (d) 25 +15 and 81÷40

Solution :

(a) Given, $5 - 39$ and $54 - 6$

Let numerator, $p = 5 - 39 = -34$
and denominator, $q = 54 - 6 = 48$
Hence, rational number $= \frac{p}{q} = \frac{-34}{48}$

(b) Given, $(-4) \times 6$ and $8 + 2$
Let numerator, $p = (-4) \times 6 = -24$
and denominator $q = 8 + 2 = \frac{8}{2} = 4$

Hence, rational number $= \frac{p}{q} = \frac{-24}{4}$

(c) Given, $35 + (-7)$ and $35 - 18$
Let numerator, $p = 35 + (-7) = \frac{35}{-7} = -5$

and denominator, $q = 35 - 18 = 17$
Hence, rational number $= \frac{p}{q} = \frac{-5}{17}$

Question 89:
Write the following as rational numbers in their standard forms.

(a) 35% (b) 1.2
(c) $-6\frac{3}{7}$ (d) $240 + (-840)$
(e) $115 + 207$

Solution :

(a) Given, $35\% = \dfrac{35}{100}$

7	35
5	5
	1

2	100
2	50
5	25
5	5

By using prime factorisation, we get

$35 = 7 \times 5$ and $100 = 2 \times 2 \times 5 \times 5$

$\therefore$ HCF of 35 and 100 = 5

On dividing numerator and denominator by their HCF, we get

$$\frac{35 \div 5}{100 \div 5} = \frac{7}{20}$$

(b) Here, $1.2 = \dfrac{12}{10} = \dfrac{12 \div 2}{10 \div 2} = \dfrac{6}{5}$ [$\because$ HCF of 12 and 10 = 2]

(c) Here, $-6\dfrac{3}{7} = -\left(\dfrac{6 \times 7 + 3}{7}\right) = \dfrac{-45}{7}$

(d) Here, $240 \div (-840) = \dfrac{240}{-840}$

$\because$ HCF of 240 and 840 = 120

On dividing numerator and denominator by their HCF, we get

$$\frac{240 \div 120}{-840 \div 120} = \frac{2}{-7}$$

$$= \frac{2 \times (-1)}{-7 \times (-1)}$$ [multiplying numerator and denominator by (-1) for positive denominator]

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

(e) Given, $115 \div 207 = \dfrac{115}{207}$

5	115
23	23
	1

3	207
3	69
23	23
	1

By using prime factorisation, we get

$115 = 5 \times 23$ and $207 = 3 \times 23 \times 3$

$\therefore$ HCF of 115 and 207 = 23

On dividing numerator and denominator by their HCF, we get

$$\frac{115 \div 23}{207 \div 23} = \frac{5}{9}$$

Question 90:
Find a rational number exactly halfway between

(a) $\frac{-1}{3}$ and $\frac{1}{3}$ (b) $\frac{1}{6}$ and $\frac{1}{9}$

(c) $\frac{5}{-13}$ and $\frac{-7}{9}$ (d) $\frac{1}{15}$ and $\frac{1}{12}$

We know that, a rational number, which is halfway between two rational number i.e. a and b $= \frac{a+b}{2}$.

(a) Given rational numbers are $\frac{-1}{3}$ and $\frac{1}{3}$.

Here, $a = -\frac{1}{3}$ and $b = \frac{1}{3}$

$$\therefore \quad \frac{a+b}{2} = \frac{-\frac{1}{3}+\frac{1}{3}}{2} = \frac{0}{2} = 0$$

Hence, the exactly halfway between $-\frac{1}{3}$ and $\frac{1}{3}$ is 0 (zero).

(b) Given rational numbers are $\frac{1}{6}$ and $\frac{1}{9}$.

Here, $a = \frac{1}{6}$ and $b = \frac{1}{9}$

$$\therefore \quad \frac{a+b}{2} = \frac{\frac{1}{6}+\frac{1}{9}}{2} = \frac{\frac{1\times 3}{6\times 3}+\frac{1\times 2}{9\times 2}}{2} \qquad [\because \text{LCM of 6 and 9} = 18]$$

$$= \frac{\frac{3}{18}+\frac{2}{18}}{2}$$

$$= \frac{\frac{3+2}{18}}{2} = \frac{\frac{5}{18}}{2} = \frac{5}{18\times 2} = \frac{5}{36}$$

Hence, the exactly halfway between $\frac{1}{6}$ and $\frac{1}{9}$ is $\frac{5}{36}$.

Solution :

(c) Given rational numbers are $\frac{5}{-13}$ and $\frac{-7}{9}$.

Here, $a = -\frac{5}{13}$ and $b = -\frac{7}{9}$

$$\therefore \quad \frac{a+b}{2} = \frac{\frac{-5}{13}+\left(-\frac{7}{9}\right)}{2} = \frac{\frac{-5}{13}-\frac{7}{9}}{2}$$

$$= \frac{\frac{-5\times 9}{13\times 9}-\frac{7\times 13}{9\times 13}}{2} \qquad [\because \text{LCM of 13 and 9} = 117]$$

$$= \frac{\frac{-45}{117}-\frac{91}{117}}{2} = \frac{\frac{-45-91}{117}}{2}$$

$$= \frac{-136}{117\times 2} = \frac{-136}{234}$$

Hence, the exactly of halfway between $\frac{5}{-13}$ and $\frac{-7}{9}$ is $-\frac{136}{234}$.

(d) Given rational numbers are $\frac{1}{15}$ and $\frac{1}{12}$.

Here, $a = \frac{1}{15}$ and $b = \frac{1}{12}$

$$\therefore \quad \frac{a+b}{2} = \frac{\frac{1}{15} + \frac{1}{12}}{2} = \frac{\frac{1\times 4}{15\times 4} + \frac{1\times 5}{12\times 5}}{2} \qquad [\because \text{LCM of 15 and 12} = 60]$$

$$= \frac{\frac{4}{60} + \frac{5}{60}}{2} = \frac{\frac{4+5}{60}}{2} = \frac{9}{60\times 2} = \frac{9}{120}$$

$$= \frac{3}{40}$$

Hence, the exactly halfway between $\frac{1}{15}$ and $\frac{1}{12}$ is $\frac{3}{40}$.

Question 91:

Taking $x = \frac{-4}{9}$, $y = \frac{5}{12}$ and $z = \frac{7}{18}$, find

(a) The rational number which when added to x gives y.
(b) The rational number which subtracted from y given z.
(c) The rational number which when added to z gives us x.
(d) The rational number which when multiplied by y to get x.
(e) The reciprocal of $x + y$.
(f) The sum of reciprocals of x and y.
(g) $(x \div y) \times z$
(h) $(x - y) + z$
(i) $x + (y + z)$
(j) $x \div (y \div z)$
(k) $x - (y + z)$

Solution :

Given, $x = \frac{-4}{9}$, $y = \frac{5}{12}$ and $z = \frac{7}{18}$

(a) Let we add A to x to get y.

$$\therefore \quad A + x = y$$

$$\Rightarrow A + \left(\frac{-4}{9}\right) = \frac{5}{12}$$

$$\Rightarrow A = \frac{5}{12} - \left(-\frac{4}{9}\right) = \frac{5}{12} + \frac{4}{9} = \frac{5\times 3 + 4\times 4}{36} \qquad [\because \text{LCM of 12 and 9} = 36]$$

$$= \frac{15+16}{36} = \frac{31}{36}$$

(b) Let we subtract A from y to get z.

$$\therefore \quad y - A = z$$

$$\Rightarrow \frac{5}{12} - A = \frac{7}{18}$$

$$\Rightarrow \quad -A = \frac{7}{18} - \frac{5}{12} = \frac{7\times 2 - 5\times 3}{36} \qquad [\because \text{LCM of 18 and 12} = 36]$$

$$= \frac{14-15}{36} = \frac{-1}{36}$$

$$\Rightarrow \quad A = \frac{1}{36}$$

(c) Let A be added to z to give x.

$\therefore \quad A + z = x$

$\Rightarrow \quad A + \frac{7}{18} = \frac{-4}{9}$

$\Rightarrow \quad A = \frac{-4}{9} - \frac{7}{18} = \frac{-4 \times 2 - 7 \times 1}{18}$ $\quad$ [$\because$ LCM of 9 and 18 = 18]

$= \frac{-8-7}{18} = \frac{-15}{18} = \frac{-5}{6}$

(d) Suppose, if A is multiplied by y, then we get x.

i.e. $A \times y = x$

$\Rightarrow A \times \frac{5}{12} = \frac{-4}{9}$

$\Rightarrow \quad A = \frac{-4}{9} \times \frac{12}{5} = \frac{-48}{45}$

(e) Here, $x + y = \frac{-4}{9} + \frac{5}{12} = \frac{-4 \times 4 + 5 \times 3}{36}$ $\quad$ [$\because$ LCM of 9 and 12 = 36]

$\Rightarrow \quad x + y = \frac{-16+15}{36} = \frac{-1}{36}$

$\therefore$ Reciprocal of $x + y = \frac{1}{-1/36} = -36$

(f) Reciprocal of x and y is $\frac{1}{x}$ and $\frac{1}{y}$.

$\therefore$ Sum of reciprocals $= \frac{1}{x} + \frac{1}{y} = \frac{1}{-4/9} + \frac{1}{5/12}$

$= \frac{-9}{4} + \frac{12}{5} = \frac{-45+48}{20}$ $\quad$ [$\because$ LCM of 4 and 5 = 20]

$= \frac{3}{20}$

(g) We have, $(x \div y) \times z$

$= \left(\frac{-4}{9} \div \frac{5}{12}\right) \times \frac{7}{18}$

$= \left(\frac{-4}{9} \times \frac{12}{5}\right) \times \frac{7}{18}$ $\quad$ $\left[\because \text{reciprocal of } \frac{5}{12} = \frac{12}{5}\right]$

$= \frac{-4 \times 12 \times 7}{9 \times 5 \times 18}$ $\quad$ $\left[\because \text{product of rational numbers} = \frac{\text{product of numerators}}{\text{product of denominators}}\right]$

$= \frac{-56}{135}$

(h) We have,

$(x - y) + z = \left(\frac{-4}{9} - \frac{5}{12}\right) + \frac{7}{18} = \frac{-4 \times 4 - 5 \times 3}{36} + \frac{7}{18}$ $\quad$ [$\because$ LCM of 9 and 12 = 36]

$= \frac{-16-15}{36} + \frac{7}{18} = \left(\frac{-31}{36} + \frac{7}{18}\right)$

$= \frac{-31 + 7 \times 2}{36} = \frac{-31+14}{36}$

$= \frac{-17}{36}$

(i) Here, $x + (y + z) = \frac{-4}{9} + \left(\frac{5}{12} + \frac{7}{18}\right) = \frac{-4}{9} + \left(\frac{5 \times 3 + 7 \times 2}{36}\right)$ [$\because$ LCM of 12 and 18 = 36]

$$= \frac{-4}{9} + \left(\frac{15 + 14}{36}\right)$$

$$= \frac{-4}{9} + \frac{29}{36} = \frac{-4 \times 4 + 29}{36} = \frac{13}{36}$$

(j) Here, $x \div (y \div z) = \frac{-4}{9} \div \left(\frac{5}{12} \div \frac{7}{18}\right) = \frac{-4}{9} \div \left(\frac{5}{12} \times \frac{18}{7}\right)$ $\left[\because \text{reciprocal of } \frac{7}{18} = \frac{18}{7}\right]$

$$= \frac{-4}{9} \div \frac{15}{14} = \frac{-4}{9} \times \frac{14}{15} = \frac{-56}{135}$$ $\left[\because \text{reciprocal of } \frac{15}{14} = \frac{14}{15}\right]$

(k) Here, $x - (y + z) = \frac{-4}{9} - \left(\frac{5}{12} + \frac{7}{18}\right)$

$$= \frac{-4}{9} - \left(\frac{5 \times 3 + 7 \times 2}{36}\right) = \frac{-4}{9} - \left(\frac{15 + 14}{36}\right)$$ [$\because$ LCM of 12 and 18 = 36]

$$= \frac{-4}{9} - \frac{29}{36} = \frac{-4 \times 4 - 29}{36} = \frac{-16 - 29}{36}$$

$$= \frac{-45}{36} = \frac{-5}{4}$$

Question 92:

What should be added to $\frac{-1}{2}$ to obtain the nearest natural number?

Solution :

We know that, nearest number of $\frac{-1}{2}$ is 1.

Let x be added to $-\frac{1}{2}$ to obtain 1.

Then, $-\frac{1}{2} + x = 1$

$\Rightarrow$ $x = 1 + \frac{1}{2} = \frac{2+1}{2}$

$\Rightarrow$ $x = \frac{3}{2}$

Hence, $\frac{3}{2}$ should be added to $\frac{-1}{2}$ to obtain nearest natural number.

Question 93:

What should be subtracted from $\frac{-2}{3}$ to obtain the nearest integer?

Solution :

Given rational number is $\frac{-2}{3}$.

We know that, nearest natural number of $\frac{-2}{3}$ is -1.

Let x be subtracted to $\frac{-2}{3}$ to obtain -1.

Then, $$\frac{-2}{3} - x = -1$$

$\Rightarrow$ $$x = \frac{-2}{3} + 1 = \frac{1}{3}$$

So, we subtract $\frac{1}{3}$ from $\frac{-2}{3}$ to get the nearest integer.

Question 94:

What should be multiplied with $\frac{-5}{8}$ to obtain the nearest integer?

Solution :

Let number be x.

We know that, nearest integer of $-\frac{5}{8}$ is -1

According to the question, $$\frac{-5}{8} \times x = -1$$

$\Rightarrow$ $$x = -1 \times \frac{8}{-5} = \frac{8}{5}$$

Hence, the required number is $\frac{8}{5}$.

Question 95:

What should be divided by $\frac{-1}{2}$ to obtain the greatest negative integer?

Solution :

Let the number be x.

We know that, greatest negative integer is -1.

According to the question,

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

$\Rightarrow$ $$\frac{1}{2} \times \frac{1}{x} = -1 \qquad \left[\because \text{reciprocal of } x = \frac{1}{x}\right]$$

$\Rightarrow$ $$\frac{1}{x} = -1 \times \frac{2}{1}$$

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

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

Hence, the required number is $\frac{-1}{2}$.

Question 96:

From a rope 68 m long, pieces of equal size are cut. If length of one piece is $4\frac{1}{4}$ m, find the number of such pieces.

Solution :

Given, length of the rope = 68 m

and length of small piece $= 4\frac{1}{4}\,m = \frac{(4\times4)+1}{4}\,m = \frac{17}{4}\,m$

$\therefore$ Number of pieces $= \frac{\text{Total length of rope}}{\text{Length of small piece}} = \frac{68}{\frac{17}{4}}$

$= \frac{68}{1}\times\frac{4}{17}$ $\quad\left[\because \text{reciprocal of } \frac{17}{4} = \frac{4}{17}\right]$

$= 4\times4 = 16$

Hence, the number of pieces is 16.

Question 97:

If 12 shirts of equal size can be prepared from 27 m cloth, what is length of cloth required for each shirt?

Solution :

Given, total size of available cloth = 27 m

Since, 12 shirts can be made from 27 m long cloth.

$\therefore$ Length of cloth required for each shirt $= \frac{\text{Total available cloth}}{\text{Number of shirts}}$

$= \frac{27}{12} = \frac{9}{4}$

$= 2.25\,m$

Hence, 2.25 m cloth required for each shirt.

Question 98:

Insert 3 equivalent rational numbers between

(i) $\frac{-1}{2}$ **and** $\frac{1}{5}$ **(ii) 0 and – 10**

Solution :

(i) Given, rational numbers are $-\frac{1}{2}$ and $\frac{1}{5}$.

For common denominator, LCM of 2 and 5 = 10

$\therefore \quad \frac{-1\times5}{2\times5} = \frac{-5}{10}$ and $\frac{1\times2}{5\times2} = \frac{2}{10}$

Hence, three equivalent rational numbers between $\frac{-5}{10}$ and $\frac{2}{10}$ are $\frac{-3}{10}, \frac{-6}{20}, \frac{-9}{30}$.

(ii) Three equivalent rational numbers between 0 and –10 are $-2, \frac{-10}{5}, \frac{-20}{10}$.

Note *In this question, student should note that answer can vary.*

Question 99:

150 students are studying English, Maths or both. 62% of the students are studying English

and 68% are studying Maths. How many students are studying both?

Solution :

Given, total students in the class studying English, Maths or both = 150

Students studying English = 62% of 150 = $\frac{62}{100} \times 150 = 93$

Students studying Maths = 68% of 150 = $\frac{68}{100} \times 150 = 102$

Total students studying both = Students studying English + Students studying Maths − Students studying English, Maths or both

$= 93 + 102 - 150 = 45$

Question 100:

A body floats $\frac{2}{9}$ of its volume above the surface. What is the ratio of the body submerged volume to its exposed volume? Rewrite it as a rational number.

Solution :

Given, volume of body exposed = $\frac{2}{9}$

$\therefore$ Volume of body submerged = 1 − Volume of body exposed

$= 1 - \frac{2}{9} = \frac{9-2}{9} = \frac{7}{9}$

$\therefore$ Required ratio = $\frac{7}{9} : \frac{2}{9} = \frac{7}{9} \div \frac{2}{9} = \frac{7}{9} \times \frac{9}{2} = \frac{7}{2} = 7:2$

In rational number = $\frac{7}{2}$

Solution of Previous Years' Question Papers

2019

1st term

3) Hema had $\frac{5}{8}$ Kg of tea. She repacked the tea into bags of $\frac{5}{32}$ Kg each. How many bags of tea did Hema get?

Let the no. of bags of tea be x

$\therefore \frac{5x}{32} = \frac{5}{8}$

or, $x = \frac{5 \times 32}{5 \times 8} = 4$ bags

4) Simplify: $[(\frac{5}{9} X \frac{3}{7}) \div \frac{8}{21}] X (\frac{-3}{5})]$

$\frac{5}{9} x \frac{3}{7} x \frac{21}{8} x \frac{-3}{5} = \frac{-3}{8}$

1) Sourav got a baby rabbit and a pup. The rabbit weighs $\frac{7}{16}$ Kg and the pup weighs $\frac{3}{4}$ Kg. How many times is the pup heavier than the baby rabbit?

Required times = $\frac{3}{4} \div \frac{7}{16} = \frac{3 \times 16}{4 \times 7} = \frac{12}{7} = 1\frac{5}{7}$ times

3rd Term

3. Multiply : $\frac{-8}{57} X \frac{19}{-32}$

Ans-1/12

2018

1st Term

ii) After simplifying $\frac{4}{5}$ x $\frac{3}{7}$ x $\frac{1}{8}$ we get

a) $\frac{3}{70}$ b) $\frac{3}{35}$ c) $\frac{4}{70}$ d) none of these

ii) After simplifying $\frac{4}{5}$ x $\frac{3}{7}$ x $\frac{1}{8}$ we get

$a)$ $\frac{3}{70}$

i)Reciprocal of $|-3\frac{3}{4}|$ is $\frac{4}{15}$

ii)Expressing $\frac{27}{64}$ in power notation we get $(\frac{3}{4})^3$.

v)Subtracting $\frac{-3}{5}$ from $\frac{2}{5}$ we get 1

i)All rational numbers are fractions. FALSE

ii)Absolute value of $-(\frac{7}{8})^2$ is $\frac{49}{64}$. TRUE

v)solving $|x|=21 \div 3\frac{1}{2}$ we get 6 or -6.TRUE

(iii) Find the difference: $-\frac{3}{7}-\frac{4}{7}$.

(iii) $-\frac{3}{7}-\frac{4}{7}=-\frac{7}{7}=-1$.

(iv) Divide: $\frac{9}{-14} \div 6$.

(iv) $-\frac{9}{14} \div 6 = \frac{-9}{14} \times \frac{1}{6} = \frac{-3}{28}$

(v) Express $-\frac{1}{32}$ in power notation.

(v) $-\frac{1}{32} = -\frac{1}{2^5}$

(iii) Add: $(-1\frac{5}{12}) + 2\frac{1}{16}$

(iii) $(-1\frac{5}{12}) + 2\frac{1}{16}$

$= -\frac{17}{12} + \frac{33}{16} = \frac{-17\times4+33\times3}{48} = \frac{-68+99}{48} = \frac{31}{48}$

(iv) Simplify: $\frac{11}{-25} + \frac{9}{20} - \frac{-17}{50} + \frac{51}{100}$

(iv) $\frac{11}{-25} + \frac{9}{20} - \frac{-17}{50} + \frac{51}{100}$

$= \frac{-220 \;\; +225 \;\; +170 \;\; +255}{500} = \frac{430}{500} = \frac{43}{50}$

2nd Term

(iii) Divide: $-\frac{5}{9} \div \frac{2}{-3}$

(iii) $-\frac{5}{9} \div \frac{2}{-3}$

$= -\frac{5}{9} \times \frac{-3}{2}$

$= \frac{5}{6}$

(v) The product of two numbers is $-24\frac{1}{2}$. If one of the numbers is $5\frac{1}{4}$, find the other number.

Or

By what number should we multiply $-4\frac{9}{14}$ so that the product is $4\frac{8}{63}$?

(v) The product of two numbers is $-24\frac{1}{2} = -\frac{49}{2}$

One of the numbers is $5\frac{1}{4} = \frac{21}{4}$

Let the other number be x.

Then $x \times \frac{21}{4} = -\frac{49}{2}$

Or $x = -\frac{49}{2} \div \frac{21}{4}$

Or $x = -\frac{49}{2} \times \frac{4}{21} = \frac{-14}{3} = -4\frac{2}{3}$

Or

Let the required number be x, then

BTP

$-4\frac{9}{14} \times x = 4\frac{8}{63}$

Or $x = 4\frac{8}{63} \div (-4\frac{9}{14})$

Or $x = \frac{260}{63} \div (-\frac{65}{14})$

Or $x = \frac{260}{63} \times -\frac{14}{65} = -\frac{8}{9}$

i)Simplify: $3\frac{1}{7}$ x$(3\frac{1}{2} - 5\frac{1}{4})$ x $(5\frac{1}{4} + 3\frac{1}{2})x1\frac{1}{11}$

Ans:$\frac{22}{7}$ x $(-\frac{7}{4})$ x $\frac{35}{4}$ x $\frac{12}{11} = \frac{-105}{2} = -52\frac{1}{2}$

Exercise Problems

1. What is the additive inverse of -4/9?
2. What is the additive inverse of -9/11?
3. What is the additive inverse of 6/7?
4. State true/false: The rational number -12/(-5) and -7/17 are on opposite side of zero on the number line.
5. Which is greater: 2/3 or 5/2
6. Which is greater: -6/7 or -5/4
7. Which is greater: -1/5 or 1/5
8. Which is greater: -4 3/7 or -4 5/6
9. Find: -3/7 + 2/3

10. Find: -4/6 + (-2/11)
11. Express 6/7 as a rational number with denominator -14
12. Express 6/7 as a rational number with denominator 70
13. Express 6/7 as a rational number with denominator -21
14. Express 6/7 as a rational number with denominator -49
15. Is the number 4/(-3) rational?
16. Is 6 a positive number?
17. List 5 positive rational numbers.
18. Separate positive and negative rational numbers from the following rational numbers: (-5)/(-7), 12/(-5), 7/4, 13/(-9), 0, (-18)/(-7), (-95)/116, (-1)/(-9)
19. Which of the following rational numbers are positive? -8/7, 9/8, (-19)/(-13), (-21)/13
20. Which of the following rational numbers are negative? -3/7, (-5)/(-8), 9/(-83), (-115)/(-197)
21. Show that the rational numbers -15/35 and 4/(-6) are not equal.
22. Find the standard form of -18/45
23. Find the standard form of -12/18
24. Find the standard form of -63/210
25. Express the rational number to the lowest form: 4/22
26. Express the rational number to the lowest form: -36/180
27. Express the rational number to the lowest form: -32/(-56)
28. What is the standard form of -33/69 ?
29. What is the standard form of 125/(-175) ?
30. Fill in the blanks: The standard form of 55/(-99) is _____