

DELHI PUBLIC SCHOOL ,JAMMU

Session 2021- 2022
Foundation worksheet

Class : 8th Subject : Maths

Topic :- Rational Number

❖ Rational number:-

A number which can be expressed in form $\frac{p}{q}$ where p and q are integers and q is not equal to 0 is known as rational number

$$\text{Rational number} = \frac{\text{numerator}}{\text{denominator}} = \frac{p}{q}$$

- **Positive rational number:-**

A Rational number is said to be a positive rational number if numerator and denominator have both same Signs.

Example:- $\frac{-4}{-5}$ and $\frac{3}{10}$ are positive rational numbers.

- **Negative Rational Numbers :-**

A Rational number is said to be a negative rational number if numerator and denominator have different Signs.

Example:- $\frac{-6}{7}$ and $\frac{9}{-11}$ are negative rational number.

Additive identity: -

Let a be a rational number

$$\text{then } a + 0 = a = 0 + a$$

Example: let $a = 5/6$

$$a + 0 = 5/6 + 0 = 5/6 =$$

a

$$0 + a = 0 + 5/6 = 5/6$$

$=a$

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

- **Additive inverse:-**

Let a be rational number

$$\text{then } a + (-a) = 0 \text{ Let } a = 5/11$$

$$a + (-a) = 5/11 + (-5/11)$$

$$a + (-a) = 5/11 - 5/11$$

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

Q1. Simplify:

$$1/4 + 2/3 - 1/6 \times 4/5$$

$$1/4 + 2/3 - 2/15$$

$$= \frac{15+40-8}{60}$$

$$= \frac{55-8}{60}$$

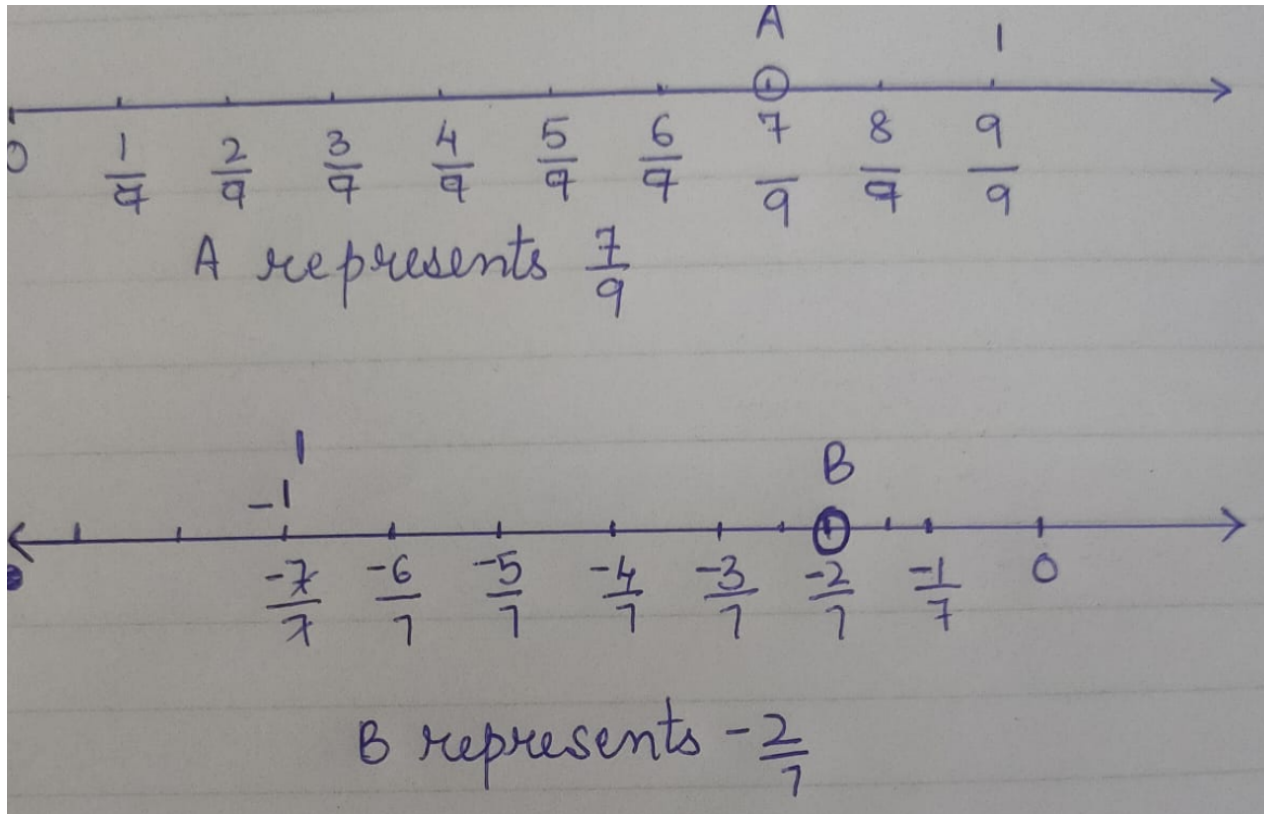
$$= \frac{47}{60}$$



Q2. Represent the following rational number on number line.

a) $\frac{7}{9}$ c) $-\frac{4}{7}$

Solution:-



Q3. Find 7 rational number between 0 and 1

Solution:- $0 = \frac{0}{1} \times \frac{8}{8} = \frac{0}{8}$ also $1 = \frac{1}{1} \times \frac{8}{8} = \frac{8}{8}$

7 rational numbers between 0 and 1 are: -

$\frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}$

Q4. Solve

If $\frac{9}{5}x = \frac{18}{5}$, then $x = \underline{\hspace{2cm}}$.

Answer: 2

Question 5: 1 is a rational number.

Answer:

The given rational number 1 is positive number, because its numerator and denominator are positive integer.

Hence, 1 is a positive rational number.

Q6. Arrange the rational numbers

$\frac{-7}{10}, \frac{5}{-8}, \frac{2}{-3}, \frac{-1}{4}, \frac{-3}{5}$ in ascending order



Answer:

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.

$$\begin{aligned}\text{So, } & \frac{-7 \times 12}{10 \times 12}, \frac{5 \times 15}{-8 \times 15}, \frac{2 \times 40}{-3 \times 40}, \frac{-1 \times 30}{4 \times 30}, \frac{-3 \times 24}{5 \times 24} \\ &= \frac{-84}{120}, \frac{75}{-120}, \frac{80}{-120}, \frac{-30}{120}, \frac{-72}{120} \\ &= \frac{-84}{120}, \frac{-75}{120}, \frac{-80}{120}, \frac{-30}{120}, \frac{-72}{120}\end{aligned}$$

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

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

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

Q7. What should be subtracted from $\frac{-2}{3}$ to obtain the nearest integer?

Answer:

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 .

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

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

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

Q8. What should be multiplied with $\frac{-5}{8}$ to obtain the nearest integer?

Answer:

Let number be x .

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

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

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

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



Q9. What should be divided by $\frac{-1}{2}$ to obtain the greatest negative integer?

Answer

Let the number be x .

We know that, greatest negative integer is -1 .

According to the question,

$$\begin{aligned} \Rightarrow \quad & \frac{1}{2} + x = -1 \\ \Rightarrow \quad & \frac{1}{2} \times \frac{1}{x} = -1 \quad \left[\because \text{reciprocal of } x = \frac{1}{x} \right] \\ \Rightarrow \quad & \frac{1}{x} = -1 \times \frac{2}{1} \\ \Rightarrow \quad & \frac{1}{x} = \frac{-2}{1} \\ \Rightarrow \quad & x = \frac{-1}{2} \end{aligned}$$

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

Q 10.Simplify:

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

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

Answer:

$$\begin{aligned} \text{(i) Given, } & \frac{13}{11} \times \frac{-14}{5} + \frac{13}{11} \times \frac{-7}{5} + \frac{-13}{11} \times \frac{34}{5} \\ & = \frac{13 \times (-14)}{11 \times 5} + \frac{13 \times (-7)}{11 \times 5} + \frac{(-13) \times 34}{11 \times 5} \\ & = \frac{-182}{55} + \frac{(-91)}{55} + \frac{(-442)}{55} \\ & = \frac{-182 - 91 - 442}{55} \\ & = \frac{-715}{55} = -13 \end{aligned}$$

[taking LCM]

$$\begin{aligned} \text{(ii) Given, } & \frac{6}{5} \times \frac{3}{7} - \frac{1}{5} \times \frac{3}{7} \\ & = \frac{6 \times 3}{5 \times 7} - \frac{1 \times 3}{5 \times 7} = \frac{18}{35} - \frac{3}{35} \\ & = \frac{18 - 3}{35} = \frac{15}{35} = \frac{15 \div 5}{35 \div 5} \\ & = \frac{3}{7} \end{aligned}$$

[dividing numerator and denominator by 5]



Q11. In each of the following pairs represent a pair of equivalent rational numbers, find the values of x.

(i) $(\frac{2}{3})$ and $(\frac{5}{x})$

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

Solution:

(i) Given $(\frac{2}{3})$ and $(\frac{5}{x})$

Also given that they are equivalent rational number so $(\frac{2}{3}) = (\frac{5}{x})$

$$x = (5 \times 3)/2$$

$$x = (15/2)$$

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

Also given that they are equivalent rational number so $(-\frac{3}{7}) = (\frac{x}{4})$

$$x = (-3 \times 4)/7$$

$$x = (-12/7)$$

Questions for practice:

Q1. Find any five rational numbers less than 3.

Q2. Find ten rational numbers between $\frac{1}{4}$ and $\frac{1}{2}$.

Q3. Verify the property: $x + y = y + x$ by taking $x = -\frac{5}{3}$ and $y = \frac{7}{5}$.

Q4. The sum of the two rational numbers is -8. If one of the numbers is $-\frac{15}{7}$, find the other number.

Q5. Verify the property: $x + (y + z) = (x + y) + z$ by taking $x = -\frac{7}{3}$, $y = \frac{8}{5}$ and $z = \frac{5}{9}$.

Q6. By what number should $-\frac{33}{16}$ be divided to get $-\frac{11}{4}$?

Q7. Verify the property: $x \times (y + z) = x \times y + x \times z$ by taking $x = -\frac{3}{7}$, $y = \frac{12}{13}$ and $z = -\frac{5}{6}$.

Q8. What number should be added to $-\frac{5}{11}$ so as to get $\frac{26}{33}$?

Q9. Verify the property: $x \times (y \times z) = (x \times y) \times z$ by taking $x = -\frac{7}{3}$, $y = \frac{12}{5}$ and $z = \frac{4}{9}$.

Q10. What number should be subtracted from $-\frac{5}{3}$ to get $\frac{5}{6}$?

Q11. By what number should we multiply $-\frac{1}{6}$ so that the product may be $-\frac{23}{9}$?

Q12. Divide the sum of $-\frac{13}{5}$ and $\frac{12}{7}$ by the product of $-\frac{31}{7}$ and $-\frac{1}{2}$.

