Class Notes	
Class: VII	**Topic: CH-9- RATIONAL NUMBERS**
Subject: MATHEMATICS	

NOTES

• Rational Number: A number that can be expressed in the form $\frac{p}{q}$, where p and q are integers and q ≠ 0, is called a rational number. The numbers $\frac{3}{4}$, $\frac{-7}{8}$ etc are rational numbers.

• All integers and fractions are rational numbers.

• If the numerator and denominator of a rational number are multiplied or divided by a non-zero integer, we get a rational number which is said to be equivalent to the given rational number.
For example: $\frac{2}{3} = \frac{2\times3}{3\times3} = \frac{6}{9}$, $\frac{-4}{14} = \frac{-4\div2}{14\div2} = \frac{-2}{7}$

• Rational numbers are classified as Positive and Negative rational numbers. When the numerator and denominator both are positive integers, it is a positive rational number. When either the numerator or the denominator is a negative integer, it is a negative rational number. For example $\frac{3}{4}$ is a positive rational number whereas $\frac{-7}{8}$ is a negative rational number.

• The number 0 is neither a positive nor a negative rational number.

• 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. The numbers $\frac{-7}{8}$, $\frac{2}{3}$ etc. are in standard form.

• There are unlimited number of rational numbers between two rational numbers.

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Exercise – 9.1

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Q1. List five rational numbers between:

(i) −1 and 0   (ii) −2 and −1   (iii) $\frac{-4}{5}$ and $\frac{-2}{3}$ (iv) $\frac{-1}{2}$ and $\frac{2}{3}$

Solution: (i) −1 and 0

$-1 = \frac{-1\times6}{1\times6} = \frac{-6}{6}$, $0 = \frac{0\times6}{1\times6} = \frac{0}{6}$

Hence, the required five rational numbers between -1 and 0 are $\frac{-5}{6}, \frac{-4}{6}, \frac{-3}{6}, \frac{-2}{3}$ and $\frac{-1}{3}$

(ii) −2 and −1

$-2 = \frac{-2\times6}{1\times6} = \frac{-12}{6}$, $-1 = \frac{-1\times6}{1\times6} = \frac{-6}{6}$

Hence, the required five rational numbers between -2 and -1 are $\frac{-11}{6}, \frac{-10}{6}, \frac{-9}{6}, \frac{-8}{6}$ and $\frac{-7}{6}$

(iii) $\frac{-4}{5}$ and $\frac{-2}{3}$

LCM of 5, 3=15

$\frac{-4}{5} = \frac{-4\times3}{5\times3} = \frac{-12\times3}{15\times3} = \frac{-36}{45}$, $\frac{-2}{3} = \frac{-2\times5}{3\times5} = \frac{-10\times3}{15\times3} = \frac{-30}{45}$

Hence, the required five rational numbers between $\frac{-4}{5}$ and $\frac{-2}{3}$ are $\frac{-35}{45}, \frac{-34}{45}, \frac{-33}{45}, \frac{-32}{45}$ and $\frac{-31}{45}$

Q2. Write four more rational numbers in each of the following patterns:

(i) $\frac{-3}{5}, \frac{-6}{10}, \frac{-9}{15}, \frac{-12}{20}$ ....

Here $\frac{-3}{5} = \frac{-3\times2}{5\times2} = \frac{-6}{10}$, $\frac{-3}{5} = \frac{-3\times3}{5\times3} = \frac{-9}{15}$, $\frac{-3}{5} = \frac{-3\times4}{5\times4} = \frac{-12}{20}$

Proceeding in similar manner we get

$\frac{-3}{5} = \frac{-3\times5}{5\times5} = \frac{-15}{25}$, $\frac{-3}{5} = \frac{-3\times6}{5\times6} = \frac{-18}{30}$, $\frac{-3}{5} = \frac{-3\times7}{5\times7} = \frac{-21}{35}$, $\frac{-3}{5} = \frac{-3\times8}{5\times8} = \frac{-24}{40}$

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(ii) $\dfrac{-1}{4}, \dfrac{-2}{8}, \dfrac{-3}{12},$ ....

Here $\dfrac{-1}{4} = \dfrac{-1 \times 2}{4 \times 2} = \dfrac{-2}{8}, \dfrac{-1}{4} = \dfrac{-1 \times 3}{4 \times 3} = \dfrac{-3}{12}$

Proceeding in similar manner we get

$\dfrac{-1}{4} = \dfrac{-1 \times 4}{4 \times 4} = \dfrac{-4}{16}, \dfrac{-1}{4} = \dfrac{-1 \times 5}{4 \times 5} = \dfrac{-5}{20}, \dfrac{-1}{4} = \dfrac{-1 \times 6}{4 \times 6} = \dfrac{-6}{24}, \dfrac{-1}{4} = \dfrac{-1 \times 7}{4 \times 7} = \dfrac{-7}{28}$

Q3. Give four rational numbers equivalent to

(i) $\dfrac{-2}{7}$ (ii) $\dfrac{5}{-3}$ (iii) $\dfrac{4}{9}$

Solution: (i) $\dfrac{-2}{7}$

$\dfrac{-2}{7} = \dfrac{-2 \times 2}{7 \times 2} = \dfrac{-4}{14}, \dfrac{-2}{7} = \dfrac{-2 \times 3}{7 \times 3} = \dfrac{-6}{21}, \dfrac{-2}{7} = \dfrac{-2 \times 4}{7 \times 4} = \dfrac{-8}{28}, \dfrac{-2}{7} = \dfrac{-2 \times 5}{7 \times 5} = \dfrac{-10}{35}$

Four rational numbers equivalent to $\dfrac{-2}{7}$ are $\dfrac{-4}{14}, \dfrac{-6}{21}, \dfrac{-8}{28}, \dfrac{-10}{35}$

(ii) $\dfrac{5}{-3}$

$\dfrac{5}{-3} = \dfrac{5 \times 2}{-3 \times 2} = \dfrac{10}{-6}, \dfrac{5}{-3} = \dfrac{5 \times 3}{-3 \times 3} = \dfrac{15}{-9}, \dfrac{5}{-3} = \dfrac{5 \times 4}{-3 \times 4} = \dfrac{20}{-12}, \dfrac{5}{-3} = \dfrac{5 \times 5}{-3 \times 5} = \dfrac{25}{-15}$
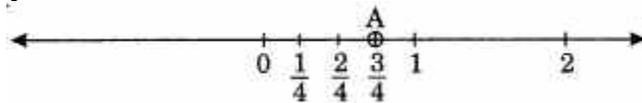
Four rational numbers equivalent to $\dfrac{5}{-3}$ are $\dfrac{10}{-6}, \dfrac{15}{-9}, \dfrac{20}{-12}, \dfrac{25}{-15}$

Q4. Draw a number line and represent the following rational numbers on it

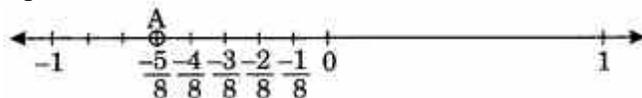(i) $\dfrac{3}{4}$ (ii) $\dfrac{-5}{8}$ (iii) $\dfrac{-7}{4}$ (iv) $\dfrac{7}{8}$

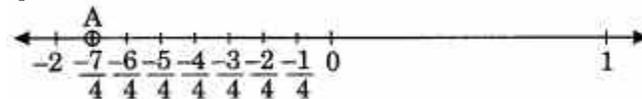**Solution:**

(i) $\dfrac{3}{4}$

Here A represents $\dfrac{3}{4}$

(ii) $\dfrac{-5}{8}$

Here A represents $\dfrac{-5}{8}$

(iii) $\dfrac{-7}{4}$

Here A represents $\dfrac{-7}{4}$

ASSIGNMENT: Exercise -9.1 -Q1-iv, Q2-iii, iv, Q3-iii, Q4-iv

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