Class 7-Mathematics

Instructions for students: The notes provided must be copied to the Maths copy and then do the homework in the same copy. (Whatever exercises you have completed, Do this chapter as a continuation)

Chapter 3

RATIONAL NUMBERS

Definition: Any number that can be expressed in the form $\frac{p}{q}$, where p, q are integers and q ≠ 0, is called a rational number.

e. g. $\frac{2}{3}, \frac{-5}{9}, \frac{-4}{-7}, \ 0, 3, -6$

IMPORTANT FACTS ABOUT RATIONAL NUMBERS

- The word 'rational' comes from the word 'ratio'. Because every rational number is a ratio between two integers. E. g.: $\frac{6}{11} = 6 : 11$
- Every integer is a rational number.

  E.g. 3 = $\frac{3}{1}$, - 5 = $\frac{-5}{1}$ 0 = $\frac{0}{1}$

- Every fraction is a rational number.

  e. g. $\frac{5}{4}, \frac{6}{7}. 3\frac{1}{2}$

- $\frac{3}{0}, \frac{-2}{0}, \frac{1}{0}$, etc. are not rational numbers since division by 0 is not allowed.
- Every rational number can be expressed as decimals.

  e.g. $\frac{1}{8} = \ 0.125$, $\frac{11}{25} = 0.44$

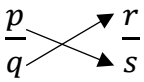
EQUIVALENT RATIONAL NUMBERS

Two or more rational numbers are said to be equivalent if they have same value.

EQUAL RATIONAL NUMBERS

Two rational numbers $\frac{p}{q}$ and $\frac{r}{s}$ are equal if and only if p×s =q×r

i.e., $\frac{p}{q} = \frac{r}{s}$ if and only if p×s =q×r



Exercise 3.1

1. Ans. $\frac{5}{8}, 7, \frac{-3}{-13} = \frac{3}{13}, \frac{-17}{-6} = \frac{17}{6}$

2. Ans. $\frac{-5}{7}, \frac{4}{-3}, -6, \frac{-28}{5}$

3. ii)Find four rational numbers equivalent to $\frac{-5}{-9}$

Solution:

$\frac{-5}{-9} = \frac{-5\times2}{-9\times2} = \frac{-10}{-18}$

$\frac{-5}{-9} = \frac{-5\times3}{-9\times3} = \frac{-15}{-27}$

$\frac{-5}{-9} = \frac{-5\times4}{-9\times4} = \frac{-20}{-36}$

$\frac{-5}{-9} = \frac{-5\times5}{-9\times5} = \frac{-25}{-45}$

$\frac{-10}{-18}, \frac{-15}{-27}, \frac{-20}{-36}, \frac{-25}{-45}$ are equivalent to $\frac{-5}{-9}$.

5. i) Ans. $\frac{5}{20}, \frac{6}{24}, \frac{7}{28}, \frac{8}{32}$

ii) Ans. $\frac{-10}{15}, \frac{-12}{18}, \frac{-14}{21}, \frac{-16}{24}$

Exercise 3.2

5. Fill in the boxes with correct symbol <, > or =.

i) $\frac{-4}{5}$ ☐ $\frac{-5}{7}$ ii) $\frac{-5}{8}$ ☐ $\frac{-7}{4}$ iii) $\frac{-7}{8}$ ☐ $\frac{42}{-48}$

Solution:

i) $\frac{-4}{5}$ $\frac{-5}{7}$

L.C.M of 5 and 7 =35

$\frac{-4}{5} = \frac{-4\times7}{5\times7} = \frac{-28}{35}$

$\frac{-5}{7} = \frac{-5\times5}{7\times5} = \frac{-25}{35}$

$$\frac{-28}{35} < \frac{-25}{35}$$

$$\therefore \quad \frac{-4}{5} \boxed{<} \frac{-5}{7}$$

ii) $\frac{-5}{8}$ $\frac{-7}{4}$

L.C.M of 8 and 4 =8

$$\frac{-5}{8} = \frac{-5\times1}{8\times1} = \frac{-7}{4}$$

$$\frac{-7}{4} = \frac{-7\times2}{4\times2} = \frac{-14}{8}$$

$$\frac{-7}{4} > \frac{-14}{8}$$

$$\frac{-5}{8} \boxed{>} \frac{-7}{4}$$

iii) $\frac{-7}{8}$ $\frac{42}{-48}$

L.C.M of 8 and 48= 48

$$\frac{-7}{8} = \frac{-7\times6}{8\times6} = \frac{-42}{48}$$

$$\frac{42}{-48} = \frac{42\times-1}{-48\times-1} = \frac{-42}{48}$$

$$\therefore \frac{-7}{8} \boxed{=} \frac{42}{-48}$$

6. Arrange the following rational numbers in Ascending order.

ii) $\frac{-3}{4}, \frac{5}{-12}, \frac{9}{-24}, \frac{-7}{16}$

i.e. $\frac{-3}{4}, \frac{-5}{12}, \frac{-9}{24}, \frac{-7}{16}$

2	4, 12, 24, 16
2	2, 6, 12, 8
2	1, 3, 6, 4
2	1, 3, 3, 2
3	1, 3, 3, 1
	1, 1, 1, 1

L.C.M of 4, 12, 24, 16 = 2×2×2×2×3 = 48

$$\frac{-3}{4} = \frac{-3\times12}{4\times12} = \frac{-36}{48}$$

$$\frac{-5}{12} = \frac{-5\times4}{12\times4} = \frac{-20}{48}$$

$$\frac{-9}{24} = \frac{-9\times2}{24\times2} = \frac{-18}{48}$$

$$\frac{-7}{16} = \frac{-7\times3}{16\times3} = \frac{-21}{48}$$

$$\frac{-36}{48} < \frac{-21}{48} < \frac{-20}{48} < \frac{-18}{48}$$

$$\frac{-3}{4} < \frac{-7}{16} < \frac{5}{-12} < \frac{9}{-24}$$

Home Work: Complete Exercise3.1 and 3.2 in the Maths copy.