DEBOLINA GHOSH
TEACHER OF MATHEMATICS
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RBS, CR PARK

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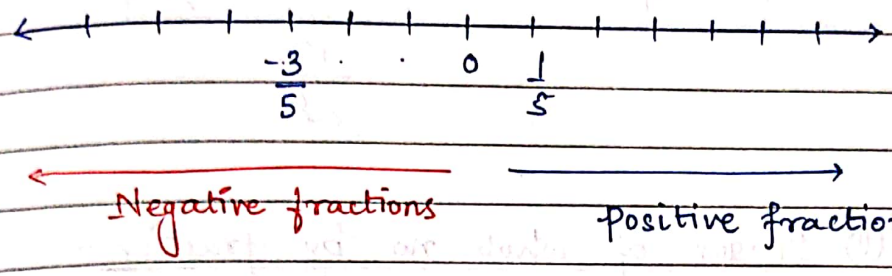
CLASS - VII
CHAPTER - 2
FRACTIONS & DECIMALS

FRACTIONS ON NUMBER LINE :-

In order to represent a fraction on a number line, we divide the line segment between 2 whole numbers into n equal parts.



MULTIPLICATION OF FRACTIONS :-

(1) Multiplication of fraction by whole no. —

eg:- $7 \times \frac{1}{3} = \frac{7}{3}$.

$5 \times \frac{7}{45} = \frac{35}{45} = \frac{7}{9}$

(2) Multiplication of fraction by fraction —

eg:- $\frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$.

$-\frac{4}{13} \times \frac{5}{7} = -\frac{20}{91}$.

Fraction x Fraction = Prod. of Num. / Prod. of Deno.

* 'OF' ——— of means multiplication.

eg:- $\frac{1}{3}$ of $\frac{1}{8} = \frac{1}{3} \times \frac{1}{8} = \frac{1}{24}$.

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DIVISION OF FRACTIONS –

Reciprocal of a fraction – Obtained by interchanging numerator & denominator.

eg:- Reciprocal of $\frac{2}{5} = \frac{5}{2}$.

* $\frac{0}{5} = 0$, but, $\frac{5}{0}$ = Undefined.

(i) **Division of ~~whole no.~~ fraction by fraction** –

eg:- $\frac{6}{7} \div \frac{8}{5} = \frac{3\cancel{8}}{7} \times \frac{5}{\cancel{8}4}$

$= \frac{15}{28}$.

(ii) **Division of whole no. by fraction** –

eg:- $63 \div \frac{5}{9} = \frac{63 \times 9}{5}$.

$= \frac{567}{5}$.

TYPES OF FRACTIONS –

(1) **PROPER FRACTIONS** – Numerator < Denominator

eg:- $\frac{1}{4}$, $\frac{7}{9}$.

(2) **IMPROPER FRACTIONS** – Numerator > Denominator

[OR]

Numerator = Denominator

eg:- $\frac{6}{5}$, $\frac{7}{2}$.

(3) **MIXED FRACTIONS** – Combination of whole no. and a proper fraction. eg:- $\frac{43}{5} = 8\frac{3}{5}$.

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(4) CONVERSION OF FRACTIONS –

An improper fraction can be represented as mixed fraction & a mixed fraction can represented as improper.

DECIMALS

Decimal numbers are used to represent numbers that are smaller than the unit 1.

$$\underbrace{23}_{\text{Integral part}} \cdot \underbrace{976}_{\text{Fractional part}}$$

MULTIPLICATION OF DECIMALS :–

(1) Multiplication of decimal numbers with whole no. –

eg :– $11 \cdot 3 \times 4 = 45 \cdot 2$

(2) Multiplication of decimals with powers of 10 –

eg :– $45 \cdot 678 \times 10 = 456 \cdot 78$

(3) Multiplication of decimals with decimals –

eg :– $23 \cdot 053 \times 6 \cdot 65 = 153 \cdot 30425$.

DIVISION OF DECIMALS :–

(1) Dividing a decimal number by a whole number –

eg :– $8 \cdot 4 \div 4 = 2 \cdot 1$

(2) Dividing a decimal number by 10, 100 or 1000 –

eg :– $23 \cdot 9 \div 10 = 2 \cdot 39$

$23 \cdot 9 \div 100 = 0 \cdot 239$

(3) Dividing two decimal numbers —

→ first shift the decimal point to the right by equal number of places in both, to convert the divisor to a whole no.

eg :- $2.4 \div 0.2$

$= 24 \div 2$

$= 12.$

~~~~~~~~~~x~~~~~~~~~~

Ex → 2.1. [IMPORTANT QUESTIONS OF NCERT BOOK]

Solve —

Q1) (i) $2 - \frac{3}{5} = \frac{2}{1} - \frac{3}{5}$

$= \frac{2 \times 5 - 3 \times 1}{5}$

$= \frac{10 - 3}{5} = \frac{7}{5}.$

(vi) $2\frac{2}{3} + 3\frac{1}{2} = \frac{8}{3} + \frac{7}{2}.$

$= \frac{8 \times 2 + 3 \times 7}{6}$

$= \frac{16 + 21}{6} = \frac{37}{6}.$

(vii) $8\frac{1}{2} - 3\frac{5}{8} = \frac{17}{2} - \frac{29}{8}$ LCM (2, 8) = 8

$= \frac{17 \times 4 - 29 \times 1}{8}$

$= \frac{68 - 29}{8}$

$= \frac{39}{8}.$
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Q7) Ritu ate $\frac{3}{5}$ part of an apple and the remaining apple was eaten by her brother Somu. How much part of the apple did Somu eat? Who had the larger share? By how much?

Soln- Let, the whole apple be 1.

Part of the apple eaten by Ritu = $\frac{3}{5}$.

Part of apple eaten by Somu = $1 - \frac{3}{5}$.

$= \frac{1 \times 5 - 3 \times 1}{5}$

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

Since, $\frac{3}{5} > \frac{2}{5}$.

∴ Ritu had larger share.

Difference b/w 2 shares = $\frac{3}{5} - \frac{2}{5}$.

$= \frac{1}{5}$.

Ex → 2.2

Q5 Find (a) $\frac{1}{2}$ of (i) 24 (ii) 46

(c) $\frac{3}{4}$ of (i) 16 (ii) 36.

Soln- (a) (i) $\frac{1}{2} \times 24 = 12$ (ii) $\frac{1}{2} \times 46 = 23$.

(c) (i) $\frac{3}{4} \times 16 = 12$ (ii) $\frac{3}{4} \times 36 = 27$.

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Q7. Find – (a) $\frac{1}{2}$ of (i) $2\frac{3}{4}$ (ii) $4\frac{2}{9}$.

(b) $\frac{5}{8}$ of (i) $3\frac{5}{6}$ (ii) $9\frac{2}{3}$.

Sol^n – (a) (i) $\frac{1}{2} \times 2\frac{3}{4} = \frac{1}{2} \times \frac{11}{4} = \frac{11}{8} = 1\frac{3}{8}$.

(ii) $\frac{1}{2} \times 4\frac{2}{9} = \frac{1}{2} \times \frac{38}{9} = \frac{19}{9} = 2\frac{1}{9}$.

(b) (i) $\frac{5}{8} \times 3\frac{5}{6} = \frac{5}{8} \times \frac{23}{6} = \frac{115}{48} = 2\frac{11}{48}$.

(ii) $\frac{5}{8} \times 9\frac{2}{3} = \frac{5}{8} \times \frac{29}{3} = \frac{145}{24} = 6\frac{1}{24}$.

Ex → 2.3

Q7. A car runs 16 Km using 1 litre of petrol. How much distance will it cover using $2\frac{3}{4}$ litres of petrol ?

Sol^n – In 1 litre of petrol, car covers 16 Km.
In $2\frac{3}{4}$ litre of petrol, car covers =

$$2\frac{3}{4} \times 16$$

$$= \frac{11}{4} \times 16$$

$$= 44 \text{ km}.$$

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EX → 2·4

Q3. Find — (ii) $\frac{4}{9} \div 5$ (iv) $4\frac{1}{3} \div 3$

(vi) $4\frac{3}{7} \div 7$.

Ans. (ii) $\frac{4}{9} \div 5 = \frac{4}{9} \times \frac{1}{5} = \frac{4}{45}$.

(iv) $4\frac{1}{3} \div 3 = \frac{13}{3} \div 3 = \frac{13}{3} \times \frac{1}{3} = \frac{13}{9}$.

(vi) $4\frac{3}{7} \div 7 = \frac{31}{7} \div 7 = \frac{31}{7} \times \frac{1}{7} = \frac{31}{49}$.

Q4. Find — (iv) $2\frac{1}{3} \div \frac{3}{5}$ (viii) $2\frac{1}{5} \div 1\frac{1}{5}$.

Ans. (iv) $2\frac{1}{3} \div \frac{3}{5} = \frac{7}{3} \div \frac{3}{5}$

$= \frac{7}{3} \times \frac{5}{3} = \frac{35}{9} = 3\frac{8}{9}$.

(viii) $2\frac{1}{5} \div 1\frac{1}{5} = \frac{11}{5} \div \frac{6}{5}$

$= \frac{11}{5} \times \frac{5}{6}$

$= \frac{11}{6} = 1\frac{5}{6}$.

Ex → 2.5

Q3. (i) Express 5 cm in metre & km.
(ii) Express 35 mm in cm, m & km.

Ans. (i) $100 \text{ cm} = 1 \text{ metre}$

$1 \text{ cm} = \frac{1}{100} \text{ m.}$

$\Rightarrow 5 \text{ cm} = \frac{5}{100} = 0.05 \text{ m.}$

$1000 \text{ m} = 1 \text{ Km}$

$1 \text{ m} = \frac{1}{1000} \text{ Km}$

$\Rightarrow 0.05 \text{ m} = \frac{0.05}{1000}$

$= 0.00005 \text{ Km.}$

(ii) $10 \text{ mm} = 1 \text{ cm}$

$1 \text{ mm} = \frac{1}{10} \text{ cm}$

$\Rightarrow 35 \text{ mm} = \frac{35}{10} = 3.5 \text{ cm.}$

$100 \text{ cm} = 1 \text{ m.}$

$1 \text{ cm} = \frac{1}{100} \text{ m.}$

$3.5 \text{ cm} = \frac{3.5}{100} = 0.035 \text{ m.}$

$1000 \text{ m} = 1 \text{ Km}$

$1 \text{ m} = \frac{1}{1000} \text{ km}$

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0.035 m = $\frac{0.035}{1000}$

= 0.0000035 km.

Q3. How much less is 28 km than 42.6 km?

Ans. 42.6 — 28 = 14.6 km.

Ex → 2.6

Q4. A two-wheeler covers a distance of 55.3 km in one litre of petrol. How much distance will it cover in 10 litre of petrol?

Ans. In 1 litre, two-wheeler covers = 55.3 km.
In 10 litre, two-wheeler covers = 55.3
× 10
553 km

Ex → 2.7

Q5. Find — (ii) 36 ÷ 0.2
(v) 0.5 ÷ 0.25.
(ix) 2.73 ÷ 1.3.

Ans. (ii) $36 \div 0.2 = 36 \div \frac{2}{10} = 36 \times \frac{10}{2} = 180.$

(v) $0.5 \div 0.25 = \frac{5}{10} \div \frac{25}{100} = \frac{5}{10} \times \frac{100}{25} = 2.$

(ix) $2.73 \div 1.3 = \frac{273}{100} \div \frac{13}{10} = \frac{273}{100} \times \frac{10}{13}$

= 2.1