Based on GANITA PRAKASH (Part II) New NCERT Textbook

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Mathematics

GANITA PRAKASH

PART-II

For the Student of Class 8

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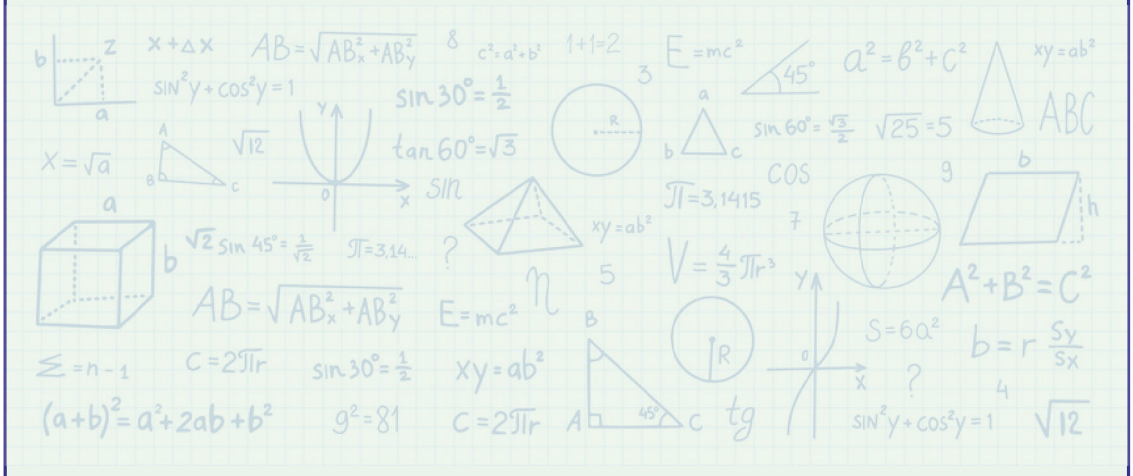


CHAPTER 1

FRACTIONS IN DISGUISE

1.1 FRACTIONS AS PERCENTAGES

Percentage

- Percentage means "out of every 100".
- The word 'per cent' is derived from the Latin phrase '*per centum*'.
- The symbol used for percentage is '%'.
- For example, 25 percent is written as 25% means 25 out of every 100.

Intext Question **Page 1**

Q. 1. Do you know what the symbol '%' means?

Solution : This symbol is read as **per cent**.

The word 'per cent' is derived from the Latin phrase *'per centum'*, meaning 'by the hundred' or 'out of hundred'.

So, 25 per cent (25%) means 25 out of every 100—like 25 people out of 100, 25 rupees out of 100 rupees, or 25 marks out of 100 marks.

If we say 50% of some quantity s, it means

$$50\% = 50 \times \frac{1}{100} \times s \text{ (50 times the unit fraction of } s\text{)}$$
$$= \frac{50}{100} \times s = \frac{1}{2} s.$$

Percentage as Fraction

- Percentages are simply fractions where the denominator is 100. Examples :

$$20\% = \frac{20}{100} = \frac{2}{10} = \frac{1}{5},$$
$$33\% = \frac{33}{100}.$$

We saw that percentages are just fractions.

- In general, z % is equivalent to $\frac{z}{100}$.

Expressing Fractions as Percentages

- A fraction as a percentage means "out of 100".
- A fraction can be converted to a percentage by expressing it as a part of 100.
- $\frac{2}{5} = \frac{4}{10} = \frac{40}{100} = 40\%$
  (means 2 parts out of 5 is equal to 40 parts out of 100)
- Simply $\frac{2}{5} = \frac{2}{5} \times 100\% = 40\%$.

Intext Question Page 1

Q. 1. Given any fraction, can we express it as a percentage?

Solution : Yes, e.g.

$$\frac{1}{5} = \frac{2}{10} = \frac{20}{100} = 20\%$$

and $\frac{33}{100} = 33\%$.

Example 1. Surya wants to use a deep orange colour to capture the sunset. He mixes some red paint and yellow paint to make this colour. The red paint makes up $\frac{3}{4}$ of this mixture. What percentage of the colour is made with red?

Solution : To express $\frac{3}{4}$ as a percentage, we need to find its equivalent fraction with 100 as the denominator. Two ways of going ahead are shown below :

Method 1

$$\frac{3}{4} = \frac{3 \times 25}{4 \times 25}$$
$$= \frac{75}{100}$$
$$= 75\%$$

Method 2

$$\frac{3}{4} = \frac{x}{100}$$
$$\frac{3}{4} \times 100 = \frac{x}{100} \times 100$$
(multiply both sides by 100)
$$x = \frac{3}{4} \times 100$$
$$= 75$$

So, $\frac{3}{4}$ can be expressed as 75%.

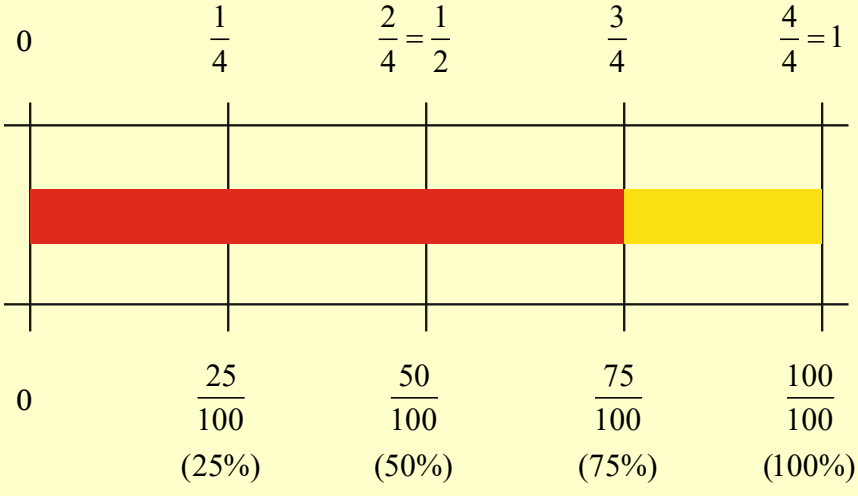
Equivalence between Fraction and Percentage

(For example, $\frac{3}{4}$ and 75%)

When we say $\frac{3}{4}$ is equivalent to 75%, it means they're two ways to express the same value, specifically :

- Fraction $\left(\frac{3}{4}\right)$: Shows 3 parts out of 4 equal parts.
- Percentage (75%) : Shows 75 parts out of 100 equal parts.
  Both represent the same amount, just expressed differently.

For example, if you eat $\frac{3}{4}$ part of a pizza that is the same as eating 75% of the pizza.



Intext Question Page 2

Q. 1. Can you tell what percentage of the colour was made using yellow?

Solution : Percentage of yellow colour = 100% – 75%

$$= \frac{100}{100} - \frac{75}{100}$$

$$= \frac{25}{100} = 25\%$$

Example 2. Surya won some prize money in a contest. He wants to save $\frac{2}{5}$ of the money to purchase a new canvas. Express this quantity as a percentage.

Solution :

Method 1

$$\frac{2}{5} = \frac{20}{50} = \frac{40}{100}$$
$$= 40\%$$

Method 2

$$\frac{2}{5} = \frac{x}{100}$$
$$x = \frac{2}{5} \times 100 = 40$$

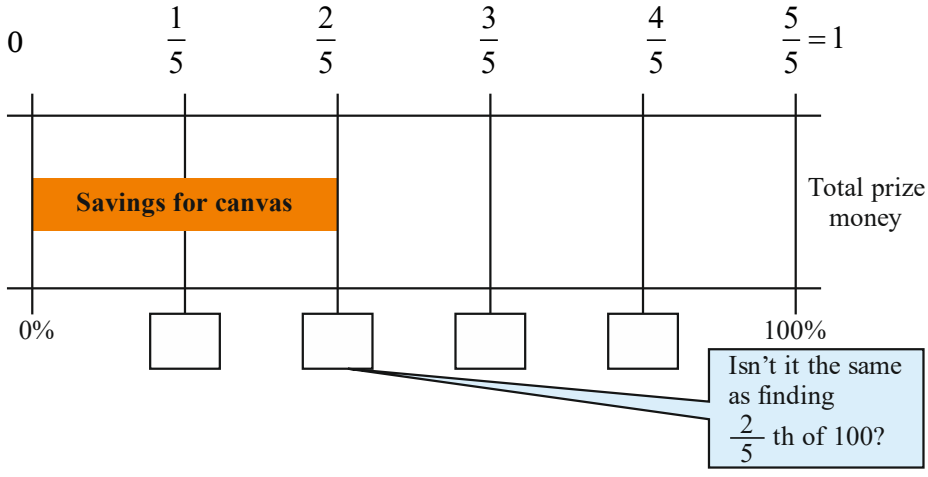
Method 3 : A fraction is part of a unit, while a percentage is per 100. Therefore, to express a fraction as a percentage, we can just multiply the fraction by 100.

$$\frac{2}{5} = \frac{2}{5} \times 100\% = 40\%$$

Intext Question Page 3

Q. 1. Try completing Method 3 by filling the boxes.

Method 3



Solution : To express fraction as a %, we can just multiply it by 100.

'%' in Ist box corresponding to $\frac{1}{5} = \frac{1}{5} \times 100\% = 20\%$

'%' in IInd box corresponding to $\frac{2}{5} = \frac{2}{5} \times 100\% = 40\%$

'%' in IIIrd box corresponding to $\frac{3}{5} = \frac{3}{5} \times 100\% = 60\%$

'%' in IVth box corresponding to $\frac{4}{5} = \frac{4}{5} \times 100\% = 80\%$

Hence, percentage in IInd box is same as $\frac{2}{5}$ th of 100.