Topic: Fractions II

• JSS2 •

Mathematics

Objective

- Express fractions as ratios, decimals and percentages.
- Convert simple fractions to ratios, decimals and percentages and vice versa.
- Solve quantitative reasoning problems related to conversion of fractions to ratios, decimals and percentages.

Expressing Fractions as Decimal

Decimal Fractions

A decimal fraction is a fraction whose denominator is not given explicitly, but is understood to be an integer power of ten. They are commonly expressed using decimal notation in which the implied denominator is determined by the number of digits to the right of a decimal separator. For instance, 0.85 the numerator is 85 and the denominator is 10 to the second power (100) because there are two digits to the right of the decimal separator.

Decimal Fractions

In decimal notation, the fraction after the decimal point is written as the numerator and the denominator is the implied power of 10.

In decimal numbers greater than 1 (4.85), the fractional part of the number is expressed by the digits to the right of the decimal (with a value of 0.85 in this case). 4.85 can be written either as an improper fraction, $^{485}/_{100}$ or as a mixed number, $4\frac{84}{100}$.

Representing Decimal Fractions Using Scientific Notation

A decimal fraction can also be expressed using scientific notation with negative exponents, such as 6.2×10^{-7}, which represents 0.00000062. the 10^{-7} represents a denominator of 10^{-7}. Dividing the numerator by 10^{7} moves the decimal point 7 places to the left.

For instance: 6.2×10^{-7} can be represented as $\frac{6.2}{10^{7}}$ which can further be expressed by moving the decimal point of the numerator 7 places to the left.

i.e.  6.2 = 0.00000062

Representing Decimal Fractions Using Scientific Notation

1. $\frac{1}{10} = \frac{1}{10^1} = 10^{-1} = o.1$
2. $\frac{1}{100} = \frac{1}{10^2} = 10^{-2} = 0.01$
3. $\frac{1}{1000} = \frac{1}{10^3} = 10^{-3} = 0.001$
4. $\frac{1}{10000} = \frac{1}{10^4} = 10^{-4} = 0.0001$
5. $\frac{1}{100000} = \frac{1}{10^5} = 10^{-5} = 0.00001$

Examples

Convert 0.75 to a common fraction

Solution

$$= \frac{0.75 \times 100}{100}$$

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

$$= \frac{75 \div 5}{100 \div 5}$$

$$= \frac{15}{20}$$

Example

Convert 24.15 as a mixed number.

Solution

whole number 24 and fraction 0.15

$$= \frac{\mathbf{0.15\ x\ 100}}{\mathbf{100}}$$

$$= \frac{\mathbf{15}}{\mathbf{100}}$$

$$= \frac{\mathbf{15 \div 5}}{\mathbf{100 \div 5}}$$

$$= 24\ \frac{\mathbf{3}}{\mathbf{20}}$$

Example 3

Convert 0.225 as a common fraction.

Solution

Multiply by 1000

$$= \frac{0.225 \ x \ 1000}{1000}$$

$$= \frac{225}{1000}$$

$$= \frac{225 \div 25}{1000 \div 25}$$

$$= \frac{9}{40}$$

Express Percentages as fractions

Percentage

In mathematics, a percentage is a number or ratio expressed as a fraction of 100 i.e. $\frac{7}{100}$ and it is often denoted using the percent sign "%" e.g. 10%. Percentage therefore is a fraction in which the denominator is 100 i.e. the numerator is "out of a hundred". In instances where only the numerator is written down, it is written then followed by a percentage (%) sign/symbol. From the example above, 7% means 7 out of 100.

Example

Convert $\frac{2}{7}$ $\boldsymbol{from\ fraction\ to\ percentage}$

Solution

$$\frac{2}{7} = \frac{2}{7} \times 100$$

$$= \frac{2}{7} \times \frac{100}{1}$$

$$= \frac{2 \times 100}{7 \times 1} = \frac{200}{7}$$

$$= 28\frac{4}{7}\%$$

Example

Convert $13\frac{3}{4}\%$ ***as a fraction***

Solution

$$= \frac{(13\ x\ 4\ ) + 3}{4}\ \%$$

$$= \frac{55}{4}\ \%$$

$$= \frac{55}{4} \div 100 \ = \frac{55}{4}\ \text{x}\ \frac{1}{100} = \frac{55}{400}$$

$$= \frac{55 \div 5}{400 \div 5} = \frac{11}{80}$$

Example

Convert 7.25% ***as a fraction***

Solution

$$= 7.25\% = \frac{\mathbf{7.25\ x\ 100}}{\mathbf{100}}\ \% \text{ (decimal notation)}$$

$$= \frac{\mathbf{725}}{\mathbf{100}}\ \% \ \boldsymbol{convert\ to\ percentage}$$

$$= \frac{\mathbf{725}}{\mathbf{100}} \div 100 = \frac{\mathbf{725}}{\mathbf{100}} \mathbf{x} \frac{\mathbf{1}}{\mathbf{100}} = \frac{\mathbf{575 \div 25}}{\mathbf{10000 \div 25}} = \frac{\mathbf{23}}{\mathbf{400}}$$

Express Ratio and Proportion as fractions

RATIO

Ratio in mathematics indicates how many times one number is contains another. it compares two or more quantities or values of the same kind. For example, if there are 7 oranges and 5 lemons in a basket of fruits, then the ratio of oranges to lemons is seven to five (i.e. 7:5).

RATIO

- It can be expressed as a fraction, e.g. 7:5 = $^{7}/_{5}$.
- It can be expressed in its simplest or lowest term by cancelling, and it does not contain a fraction or decimal in its lowest term.
- It is a type of measure of the relative size of two or more quantities expressed as a proportion.
- It is often used when sharing quantities.

Example

A basket of 72 oranges is to be shared between Mary, Aisha and Tayo in the ratio 2 : 8 : 6 respectively. Find the number of oranges gotten by each person.

Solution

Simplify the ratio

2 : 8 : 6 = 1 : 4 : 3

1 + 4 + 3 = 8

Mary's share ratio = $\frac{1}{8}$ x 72 = 9

Aisha's Share ratio = $\frac{4}{8}$ x 72 = 36

Tayo's Share ratio = $\frac{3}{8}$ x 72 = 27

Total Share ratio = 9 : 36 : 27

Evaluation

1. The Principal shares ₦45,000 between the three best students in the class according to their position. The first got a ratio of 25, the second got 15 and the third got 10, calculate how much money each student will get.
2. Write the following percentages as common fractions.

a) 82% b) 105%c) 60.75%

Thanks for Watching