

DECIMALS

Place value of Decimal numbers:

A fraction whose denominator is 10, 100, 1000 is called Decimal Fraction.

Place value of any digit of a number shows the place or position of the digit in the number.

| Thousands | Hundreds | Tens | Ones |
|-----------|----------|----------|----------|
| Th | H | T | O |
| | | | |

But the place value written after the decimal point is named from left to right.

| Decimal Point | Tenth | Hundredths | Thousandths |
|---------------|----------------|-----------------|------------------|
| . | $\frac{1}{10}$ | $\frac{1}{100}$ | $\frac{1}{1000}$ |
| | | | |

| Decimal Place Value Chart | | | | | | | | | | | | | |
|---------------------------|-------------------|---------------|-----------|----------|------|------|---------------|--------|------------|-------------|-----------------|---------------------|------------|
| Millions | Hundred thousands | Ten thousands | Thousands | Hundreds | Tens | Ones | Decimal point | Tenths | Hundredths | Thousandths | Ten-thousandths | Hundred thousandths | Millionths |
| | | | 3 | 6 | 8 | 4 | . | 2 | 6 | | | | |

Image 1: Decimal Place Value chart.

Observe the above table and let's find the place value of 8 and 2

The place value of 8 is TENS

The place value of 2 is TENTHS

Fractions and Decimals are similar because they both are ways to express Partial numbers.

Fractions can be expressed as Decimals by dividing.

Example: $\frac{3}{4}$ is Equivalent (equal in value) to $3 \div 4$ or 0.7

Example 1:

$$\begin{array}{cccc} 4 & 5 & 6 & . & 3 \\ 100\text{s} & 10\text{s} & 1\text{s} & & \frac{1}{10} \end{array}$$

$$400 + 50 + 6 + \frac{3}{10}$$

$$456 \frac{3}{10}$$

Example 2:

$$\begin{array}{cccc} 0 & . & 7 & 6 \\ 1\text{s} & & \frac{1}{10} & \frac{1}{100} \\ \text{Ones} + & 7 \text{ Tenth} + & 6 \text{ Hundredth} & \\ 0 + & \frac{7}{10} + & \frac{6}{100} & \\ & \frac{70}{100} + & \frac{6}{100} = & \frac{76}{100} \end{array}$$

Comparing Decimals:

To compare Decimals, we must first understand Equivalent Decimals.

$$\begin{array}{l} 0.6 = \frac{6}{10} = \frac{6}{10} \\ 0.60 = \frac{6}{100} = \frac{6}{10} \\ 0.600 = \frac{6}{1000} = \frac{6}{10} \end{array} \quad \left| \quad \begin{array}{l} \frac{7}{10} = \frac{7}{100} = \frac{7}{1000} \\ 0.7 = 0.70 = 0.700 \\ = \text{Equivalent Decimals} \end{array}$$

When we insert zeros after the last decimal digit the value does not change.

LIKE and UNLIKE DECIMALS:

Like Decimals have the same number of decimal places.

Example: 25.3, 145.7, 0.3.....

Unlike Decimals do not have the same number of decimal places

Example: 34.82, 1.923, 0.8.....

How to convert Unlike to like Decimals:

1. Find the number with the maximum number of decimal places.
2. Add zeros on the extreme right side of the decimals.
3. Example: 4.1, 23.46, 80.257
4.100, 23.460, 80.257

How to compare and order decimal numbers:

Arrange the following decimals in Ascending and Descending order

E.g: 723.1, 843.56, 7.987,

- First convert all the decimal numbers to like decimals.

= 723.100, 843.560, 7.987

723.100, 843.560, 7.987

- First compare the whole numbers

Ascending order: 7.987, 723.100, 843.560

Descending order: 843.560, 723.100, 7.987

E.g. 0.79, 0.777, 0.7

0.790, 0.777, 0.700

Ascending order: 0.700, 0.777, 0.790

Descending order: 0.790, 0.777, 0.700

CONVERSION OF FRACTIONS TO DECIMAL

Fractions whose denominators are 10, 100, 1000 can easily be converted to decimal, by putting a decimal point in the numerator accordingly.

E.g.

| | | |
|-------------------------|--------------------------|----------------------------|
| $\frac{3}{10} = 0.3$ | $\frac{5}{100} = 0.05$ | $\frac{7}{1000} = 0.007$ |
| $\frac{17}{10} = 1.7$ | $\frac{17}{100} = 0.17$ | $\frac{17}{1000} = 0.017$ |
| $\frac{217}{10} = 21.7$ | $\frac{217}{100} = 2.17$ | $\frac{217}{1000} = 0.217$ |