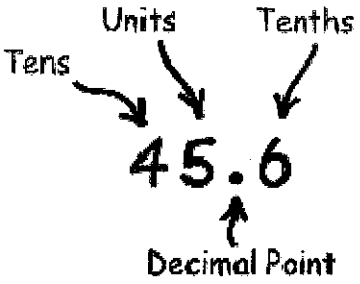
Decimals

A Decimal Number (*based on the number **10***) contains a **Decimal Point.**

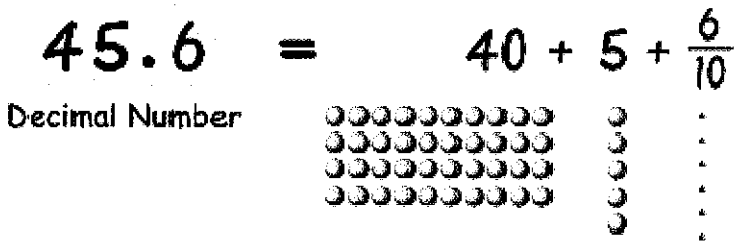


First, let's have an example:

Here is the number *"forty-five and six-tenths"* written as a decimal number:

The decimal point goes between units and tenths.

45.6 has 4 tens, 5 units and 6 tenths, like this:



Now, let's discover how it all works ...

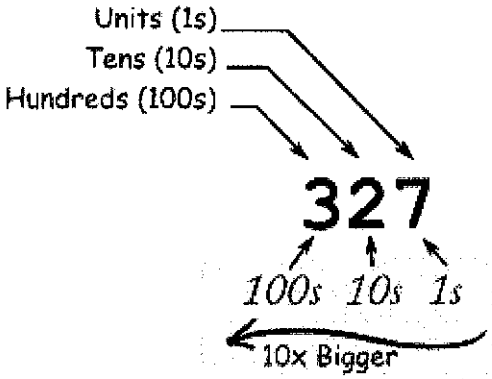
Place Value

It is all about Place Value !

When we write numbers, the **position** (or "**place**") of each digit is important.

In the number 327:

- the "7" is in the **Units** position, meaning just 7 (or 7 "1"s),
- the "2" is in the **Tens** position meaning 2 tens (or twenty),
- and the "3" is in the **Hundreds** position, meaning 3 hundreds.



"Three Hundred Twenty Seven"

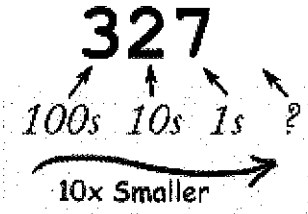
As we move left, each position is 10 times bigger!

Example: **Hundreds** are 10 times bigger than **Tens**

... and ...

As we move right, each position is 10 times **smaller**.

From **Hundreds**, to **Tens**, to **Units**

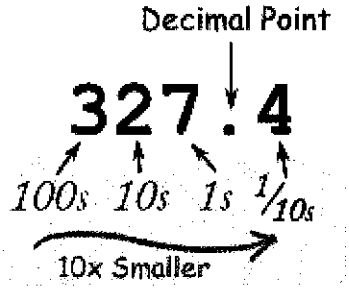


But what if we continue past Units?

What is **10 times smaller** than Units?

$^1/_{10}$ ths (Tenths) are!

But we must first write a **decimal point**,
so we know exactly where the Units position is:

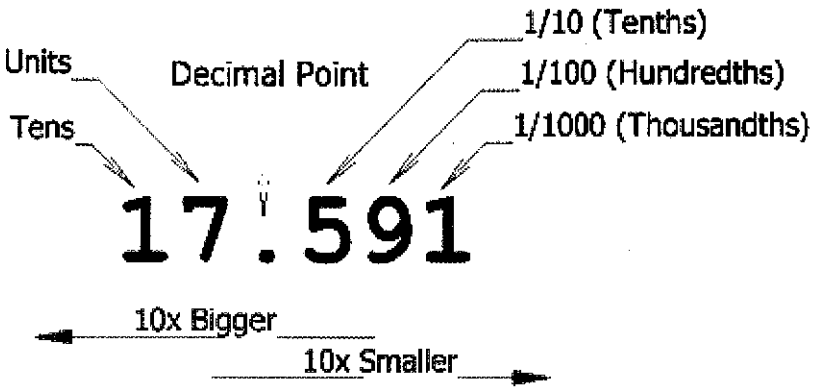


"three hundred twenty seven **and four tenths**"

but we usually just say "three hundred twenty seven **point four**"

And **that** is a Decimal Number!

We can continue with smaller and smaller values, from **tenths**, to **hundredths**, and so on, like in this example:



Large and Small

So, our Decimal System lets us write numbers as large or as small as we want, using the decimal point. Digits can be placed to the left or right of a decimal point, to indicate values greater than one or less than one.

The **decimal point** is the most important part of a Decimal Number. Without it, we would be lost ... and not know what each position meant.

17 . 591

On the left of the decimal point is a whole number (17 for example)

As we move further left, every place gets **10 times bigger**.

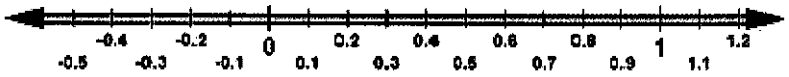
The first digit on the right means **tenths** (1/10).

As we move further right, every place gets **10 times smaller**

(one tenth as big).

Zoom into decimals ...

See decimals on the Zoomable Number Line



Definition of Decimal

The word "Decimal" really means "based on 10" (From Latin *decima*: *a tenth part*).

We sometimes say "decimal" when we mean anything to do with our numbering system, but a "Decimal Number" usually means there is a Decimal Point.

Ways to think about Decimal Numbers ...

... as a Whole Number Plus Tenths, Hundredths, etc

You could think of a decimal number as a whole number plus tenths, hundredths, etc:

Example 1: What is 2.3 ?

- On the left side is "2", that is the whole number part.
- The 3 is in the "tenths" position, meaning "3 tenths", or 3/10
- So, 2.3 is "2 and 3 tenths"

Example 2: What is 13.76 ?

- On the left side is "13", that is the whole number part.
- There are two digits on the right side, the 7 is in the "tenths" position, and the 6 is the "hundredths" position
- So, 13.76 is "13 and 7 tenths and 6 hundredths"

... as a Decimal Fraction

Or, you could think of a decimal number as a Decimal Fraction.

A Decimal Fraction is a fraction where the denominator (the bottom number) is a number such as 10, 100, 1000, etc (in other words a power of ten)

So "2.3" would look like this: $\frac{23}{10}$

And "13.76" would look like this: $\frac{1376}{100}$

... as a Whole Number and Decimal Fraction

Or, you could think of a decimal number as a Whole Number plus a Decimal Fraction.

So "2.3" would look like this: **2 and** $\frac{3}{10}$

And "13.76" would look like this: **13 and** $\frac{76}{100}$

Those are all good ways to think of decimal numbers.