

PLACE VALUE

A good understanding of decimals starts with a solid understanding of place value.

Place value refers to knowing the ‘places’ that numbers hold in the position they are written.

You probably already know the names of the places for whole numbers (see Figure 1)

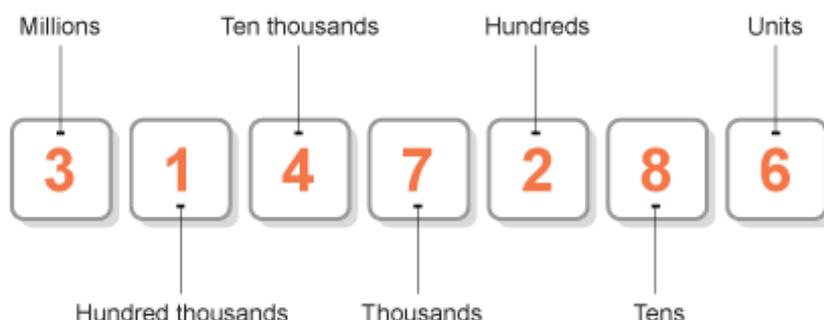


Figure 1 - from http://www.bbc.co.uk/bitesize/ks3/maths/images/place_value.gif

An example of using place value is in understanding how to understand statements like this...

In the number 3 147 286 above, the 2 has a value of 200 (2 hundred) and the 3 has a value of 3 000 000 (3 million). We also use place value to understand the size of number and knowing how to read, write and say numbers correctly.

The place value names for decimals use similar language, (see Figure 2)

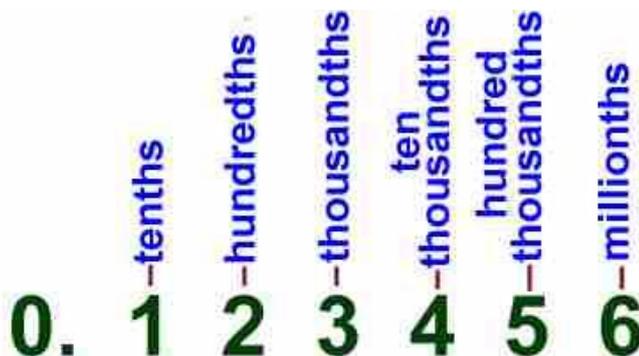


Figure 2 - from http://www.ducksters.com/kidmath/decimals_right.jpg

You might see a connection with the language used here, tenths, hundredths, thousandths – that’s right – they sound like fraction sizes... and indeed they are.

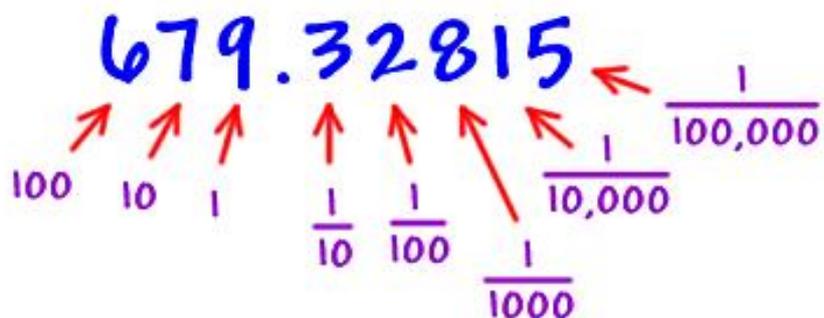


Figure 3 - from http://technomaths.edublogs.org/files/2012/02/decimal_place_value-vlayfv.jpg

Each column (when moving to the right), is ten times smaller.

Each column (when moving to the left), is ten times bigger.



WATCH THIS MOVIE

<http://youtu.be/3gaBpdEj8oM> A very simple and easy to follow clip (2mins) that explains a bit of the basics of decimals.

USING PLACE VALUE AND ORDERING DECIMALS

We use a decimal point to separate units from parts of a whole (like the tenths, hundredths, thousandths etc.)

0.1 is 1 tenth, $\frac{1}{10}$ of a unit (see the connection with the fraction language we used last week!)

0.01 is 1 hundredth, $\frac{1}{100}$ of a unit.

In the number 48.52, the value of the 5 is $\frac{5}{10}$ (which we also know as a half), which is why 0.5 is a half written using decimals.

The number 2 has value $\frac{2}{100}$.

ORDERING DECIMALS

There are 2 ways to compare the size of decimals,

- 1) to look at the digits one at a time from the left.... Biggest number wins!

Eg

12.482 and 12.402

Tens	Units	.	Tenths	Hundredths	thousandths
1	2	.	4	8	2
1	2	.	4	0	2



When comparing from the left, this column is where the digits are different, the 8 is larger than the 0, so the 12.482 is the largest number.

Sometimes numbers look like they are different lengths, to compare numbers in a case like this you would ADD zeros to make them the same length, and then compare as we did above.

Here is an example...

Which is larger? 2.507 or 2.63

Firstly, add a 0 to make them the same length...

2.507

2.630

And now compare from the left, like we did before.

Here the 2.630 is the bigger number.



QUESTION 1

In the following pairs of numbers, circle which is the largest each time

5.78	5.6099
4.32	4.59
12.6581	12.659
3.6565	3.656
123.56	123.57
1289.441	1288.441
78.55	78.5099
0.0056112	0.056112



QUESTION 2

In the following pairs of numbers, circle which is the smallest each time

0.00549	0.00557
0.0234	0.234
0.001	0.0001
9.9822	9.99



QUESTION 3

Order the following numbers in order from smallest to largest

2.556 2.565 25.65 2.055 256.5 0.255 0.025



QUESTION 4

Donna is doing some carpentry work and she buys a 2m length of wood. She will need to cut 2 pieces of wood, one of length 0.6m and one of length 1.02 m. What is the total length of wood that she needs to cut, and what is remaining from the original length?



TURNING FRACTIONS INTO DECIMALS

Remember the fraction notation we were using looked like this...

$$\frac{5}{11}$$

To turn this into a decimal you will use your calculator... treat the fraction bar line as a divided by symbol, and type into the calculator the following,

$$5 \div 11 =$$

0.4545454545

Which we could round to two 3 decimal places as 0.455.

Using this we can now compare decimals and fractions for size.



QUESTION 5

Order these numbers from largest to smallest

$$\frac{4}{5}, 0.04, 0.81, \frac{7}{11}, \frac{2}{3}, 0.9 \text{ and } \frac{1}{40}$$

Decimals come up in all areas of mathematics, being able to identify, name, record, round, add, subtract, multiply and divide (mostly using a calculator) is really important to fluent mathematical working.

Use your calculator to complete the following questions.



QUESTION 6

- 1) In the number 78.9, what digit (number) is in the tenths place? _____
- 2) In the number 78.9, what digit (number) is in the ones place? _____
- 3) In the number 78.9, what digit (number) is in the tens place? _____
- 4) In the number 6174.903, what digit is in the thousands place? _____
- 5) In the number 6174.903, what digit is in the thousandths place? _____
- 6) In the number 6174.903, what digit is in the hundredths place? _____
- 7) In the number 6174.903, what digit is in the tenths place? _____
- 8) In the number 6174.903, what digit is in the ones place? _____
- 9) In the number 6174.903, what digit is in the tens place? _____
- 10) In the number 6174.903, what digit is in the hundreds place? _____



QUESTION 7

1. Twenty-nine _____
2. Eighty-one hundredths _____
3. Nine thousand thirty-four *and* seven tenths _____
4. One *and* four thousandths _____
5. One hundred *and* sixty-two thousandths _____
6. Forty-five hundredths _____
7. Four thousand three hundred twenty-one ten-thousandths _____
8. One hundred twenty *and* five tenths _____
9. Seventeen thousandths _____
10. One *and* seven tenths _____



QUESTION 8 – ROUND THESE NUMBERS TO THE PLACE INDICATED

1) .1325 to thousandths

2) .0091 to thousandths

3) .0196 to thousandths

4) 5.1234 to thousandths

5) 6.6666 to thousandths

6) 40.61884 to thousandths

7) 1.99999 to thousandths

8) .1325 to hundredths

9) .0091 to hundredths

10) .3333 to hundredths

11) 5.567 to hundredths

12) 48.001 to hundredths

13) 7.987 to tenths

14) .666 to tenths

15) 1.32 to tenths



QUESTION 9 – CHANGE TO DECIMALS

1) $\frac{1}{8}$

5) $\frac{3}{4}$

9) $\frac{5}{8}$

2) $\frac{2}{7}$

6) $\frac{5}{10}$

10) $\frac{2}{3}$

3) $2\frac{1}{6}$

7) $13\frac{7}{8}$

11) $5\frac{1}{16}$

4) $\frac{3}{16}$

8) $8\frac{10}{15}$

12) $136\frac{3}{5}$

DECIMALS TO FRACTIONS

To change decimals to fractions, (you can use the button on your calculator!!!) or you need to identify the place name of last listed decimal place, and use that as the fraction.

EG. 0.673

The 3 is the thousandths place, so 0.673 can be written as $\frac{673}{1000}$.



QUESTION 10

Convert to fractions, use your calculator to simplify the fraction if possible.

1) .25

5) .16

9) .07

2) .2

6) .625

10) .1875

3) 3.8

7) 16.31

11) 42.325

4) .75

8) 3.35

12) 7.37



QUESTION 11

Fill in the Tables with the equivalent fractions and decimals numbers. Simplify fraction answers if possible, and round decimal answers to the nearest hundredth.

Fraction	Decimal
$\frac{1}{2}$	1)
$\frac{4}{9}$	2)
$3\frac{1}{4}$	3)
$20\frac{1}{16}$	4)
$68\frac{2}{5}$	5)

Fraction	Decimal
6)	.005
7)	.02
8)	.8
9)	7.15
10)	59.125



WATCH

<http://youtu.be/V6pZyY6mM3g> A rapping mathematician might help you remember how to deal with decimals?



QUESTION 12

Add or subtract as indicated (use your calculator wherever possible)

1)

$$\begin{array}{r} 8.7 \\ + 5.4 \\ \hline \end{array}$$

2) $74.906 + .01 + \overline{42} =$

3) $8416 + .28 + 1,489 =$

4)

$$\begin{array}{r} 38.64 \\ - 8.87 \\ \hline \end{array}$$

5) $462 - 31.2 =$

6) $16.001 - 12.984 =$

7) $.1 + 1.9 + 13 =$

8) $20 - 14.8 - .018 =$

9) $6 + 132.89 =$

10) $346.8912 - 29.98764$

11)

$$\begin{array}{r} 11,00001 \\ - 1,11234 \\ \hline \end{array}$$

12)

$$\begin{array}{r} 1234. \\ - .1234 \\ \hline \end{array}$$

13) $124.8 + 3.79 - 118.965$

14) Subtract 6.8 from 14.2

15) Subtract 38.97 from 59

16) Add .001 to 87

17) Add 5000 to .0186

18)

$$\begin{array}{r} .40 \\ 3.80 \\ 26.91 \\ + 587.89 \\ \hline \end{array}$$

