# Maths Level 1 – Fractions, Decimals and Percentages

1 of 29 – Welcome

Welcome to this session on fractions, decimals and percentages.

By the end of this session you should be able to:

* Understand and use equivalences between common fractions, decimals and percentages

2 of 29 – Decimals, fractions and percentages

In this session you will learn about the relationship between decimals, fractions and percentages, and how to use equivalences.

First, let’s check your understanding of what decimals, fractions and percentages are.

3 of 29 – Decimals

Decimal numbers break down whole numbers into smaller parts. They always have a decimal point.

The decimal point separates the whole numbers from parts of whole numbers. The two digits after the decimal point are tenths and hundredths.

The breakdown of a decimal is as follows:

Tens, Units (ones), Decimal Point, Tenths, Hundredths

Decimal numbers look the same regardless of what they are describing. It’s the symbol or word that tells you what it is measuring.

Symbols always go before the decimal number, for example, £1.30 (the pound sign is before the number). Words, or abbreviations of words, always go after the decimal number, for example, 1.5 litres.

4 of 29 – Fractions

A fraction is a part of something. Fractions show two numbers separated between a horizontal line. Fractions are always written with the numerator above the fraction line and the denominator below the fraction line. The numerator shows how many parts of the whole are being represented. The denominator shows how many parts make the whole.

5 of 29 – Fractions

Let’s look at an example. A quarter is written with a number 1 above the line (numerator) and a number 4 below the line (denominator). The numerator shows that the fraction represents 1 part of the whole. The denominator shows that 4 parts make up the whole.

6 of 29 – Percentages

Percentage means out of 100. It is represented by the percentage symbol.

Consider a square that is made up of 100 smaller squares. 50 of the smaller squares are red. So 50% of the large square is red. 25 of the smaller squares are blue. So 25% of the large square is blue. 25 of the smaller squares are white. So 25% of the large square is white.

If you add up the percentages for all the parts you get:

50% + 25% + 25% = 100%

Together the parts of the whole square add up to 100%.

Percentage parts always add up to 100.

7 of 29 – Decimals, fractions and percentages

Decimals, fractions and percentages are different ways of showing the same value.

For example, a half can be written as a percentage, or as a fraction, or as a decimal:

50%, , 0.5

Watch the following video to learn more about the relationship between decimals, fractions and percentages:

[Converting between fractions, decimals, and percent](https://www.youtube.com/embed/L3FTuI_i27k?autoplay=1&rel=0&start=0&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

8 of 29 – Converting using a number line

To help you convert percentages into fractions and vice versa, you can use a number line. Below is a description of the number line.

The first line in the number line is split into two segments, it has three markers, the first is positioned at the far left of the line (the starting point) which represents 0%, 0.0, or 0 as a fraction. The second marker is positioned at the middle point of the line which represents 50%, 0.5 or . The third marker is positioned at the far right of the line (the end point) which represents, 100%, 1.0 or 1 as a fraction.

The second line in the number line is split into four segments, it has five markers. The first, third and fifth markers are the same as on the above number line (start, middle and end points). The second marker is positioned in the middle of the first and third markers and represents 25%, 0.25 or . The forth marker is positioned in the middle of the third and fifth markers and represents 75%, 0.75 or .

The third line in the number line is split into three segments, it has four markers. The first and fourth markers are positioned at the beginning and the end of the line, and represent the same percentages, decimals and fractions as the first number line. The second marker is positioned a third of the way down the line and represents 33.3%, 0.33 or . The third marker is positioned two thirds of the way down the line and represents 66.6%, 0.66 or .

The fourth line in the number line is split into ten segments, it has eleven markers. The first, sixth and eleventh markers are positioned at the beginning, middle and the end of the line, and represent the same percentages, decimals and fractions as the first number line. Between the first and sixth marker there are four markers which are evenly separated. The second marker represents 10%, 0.1 or . The third marker represents 20%, 0.2 or . The fourth marker represents 30%, 0.3 or . The fifth marker represents 40%, 0.4 or . Between the sixth and eleventh marker there are four markers which are also evenly separated. The seventh marker represents 60%, 0.6 or . The eighth marker represents 70%, 0.7 or . The ninth marker represents 80%, 0.8 or . The tenth marker represents 90%, 0.9 or .

9 of 29 – Converting percentages to fractions

To convert a percentage into a fraction use these two steps:

**Step 1**

Write the percent divided by 100 i.e. percent over 100 – the percent would be the numerator and the 100 would be the denominator.

**Step 2**

Make the fraction as simple as possible. To simplify a fraction, divide the top and bottom by the highest number that can divide into both numbers exactly.

10 of 29 – Converting percentages to fractions

Let’s look at an example: Express 25% as a fraction in its simplest form.

**Step 1**

Write the percent divided by 100: .

**Step 2**

To make the fraction as simple as possible, divide the top and bottom number by 25:

25 ÷ 25 = 1. 100 ÷ 25 = 4. So the answer is: .

11 of 29 – Converting percentages to fractions

Watch the following video to see some more worked examples of converting percentages to fractions:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=0&end=108&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

12 of 29 – Question 1

What is 90% expressed as a fraction in its simplest form?

The correct answer is A,

13 of 29 – Converting fractions to percentages

The simplest way to convert a fraction to a percentage is to use a calculator:

**Step 1**

Divide the top number of the fraction by the bottom number.

**Step 2**

Multiply the answer by 100.

14 of 29 – Converting fractions to percentages

Let’s look at an example:

Convert to a percentage.

**Step 1**

Divide the top number of the fraction by the bottom number. 5 ÷ 8 = 0.625.

**Step 2**

Multiply the answer by 100. .

The answer is 62.5%.

15 of 29 – Converting fractions to percentages

Watch the following video to see some more worked examples of converting fractions to percentages:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=220&end=390&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

16 of 29 – Question 2

Bob wants to buy a new coat. Budget Buys are offering a 20% discount on the coat. Bargains to Go have reduced the price of the same coat by a quarter.

Which shop is cheaper?

1. Budget Buys
2. Bargains to Go

The correct answer is B, Bargains to Go.

17 of 29 – Converting percentages to decimals

To convert a percentage to a decimal, divide by 100, and remove the percentage sign.

For example, to convert 75% to a decimal, divide by 100. When you divide a number by 100 you move all the digits two places to the right. The number becomes 100 times smaller.

Consider the place value table below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Tens | Units | Decimal Point | Tenths | Hundredths |
| 7 | 5 | Point |  |  |
|  | 0 | Point | 7 | 5 |

In the table above, 75% has been added to the first row – the 7 is in the tens column and the 5 is in the units column. The second row shows 75 divided by 100 – the 7 is in the tenths column and the 5 is in the hundredths column, which becomes 0.75.

So, 75% ÷ 100 = 0.75%.

Remove the percentage sign: 75% = 0.75.

18 of 29 – Converting percentages to decimals

Watch the following video to see some more worked examples of converting percentages to decimals:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=115&end=220&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

19 of 29 – Question 3

Which of the following is 40% converted to a decimal?

1. 0.04
2. 0.4
3. 0.44
4. 4.04

The correct answer is B, 0.4.

20 of 29 – Converting decimals to percentages

To convert a decimal to a percentage, multiply by 100, and add the percentage sign.

For example, to convert 0.5 to a decimal, multiply by 100. When you multiply a number by 100 you move all the digits two places to the left. The number becomes 100 times bigger.

Multiply the decimal by 100. .

Add the percentage sign. 50 = 50%.

Answer: 50%.

21 of 29 – Converting decimals to percentages

Watch the following video to see some more worked examples of converting decimals to percentages:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=533&end=590&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

22 of 29 – Question 4

Which of the following is 0.03 converted to a percentage?

1. 300%
2. 30%
3. 3%

The correct answer is C, 3%.

23 of 29 – Converting fractions to decimals

The simplest way to convert a fraction to a decimal is to use a calculator:

Divide the top number of the fraction (numerator) by the bottom number (denominator).

Let’s look at an example:

Convert to a decimal.

Divide the top number of the fraction (numerator) by the bottom number (denominator).

2 ÷ 5 = 0.4.

Answer: 0.4.

Watch the following video to see some more worked examples of converting fractions to decimals:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=389&end=533&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

24 of 29 – Converting decimals to fractions

To convert a decimal to a fraction, follow these steps:

**Step 1**

Write the decimal ‘over’ 1, laid out like a fraction.

**Step 2**

Multiply the numerator and denominator by 10 for every number after the decimal point (times 10 for 1 number, times 100 for 2 numbers etc.).

**Step 3**

Simplify the fraction: (divide the top and bottom by the highest number that can divide into both numbers exactly). In this example, divide both numbers by 25.

The answer is .

25 of 29 – Converting decimals to fractions

Watch the following video to see some more worked examples of converting decimals to fractions:

[Converting between fractions, decimals and percentages](https://www.youtube.com/embed/-UfxONEMdU0?autoplay=1&rel=0&start=590&end=740&modestbranding=1&showinfo=0&theme=light&fs=0&probably_logged_in=0)

26 of 29 – Question 5

Match these percentages; **20%**, **75%** and **30%**, to the statements below:

1. 0.75 is the same as
2. is the same as
3. is the same as

The correct answers are:

is the same as **20%**.

is the same as **30%**.

0.75 is the same as **75%**.

27 of 29 – Question 6

Match these fractions; , and , to the statements below:

1. 0.5 is the same as
2. 0.7 is the same as
3. 80% is the same as

The correct answers are:

0.7 is the same as .

80% is the same as .

0.5 is the same as .

28 of 29 – Task

Download the accompanying **Fractions Decimals and Percentages PDF** and answer all of the questions.

Remember to complete and save your work on the PDF document.

29 of 29 – End

Well done. You have completed this session on fractions, decimals and percentages.

You should now be able to:

* Understand and use equivalences between common fractions, decimals and percentages

If you are unsure or have any questions about any of these topics, make a note and speak to your tutor for more help.