

WJEC MATHEMATICS  
**INTERMEDIATE**  
FRACTIONS, DECIMALS, AND  
PERCENTAGES

**CONVERTING BETWEEN FDP**

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**\*This booklet assumes knowledge of simplifying fractions. If you are struggling with this, see the booklet '*Simplifying and Equivalent Fractions*'**

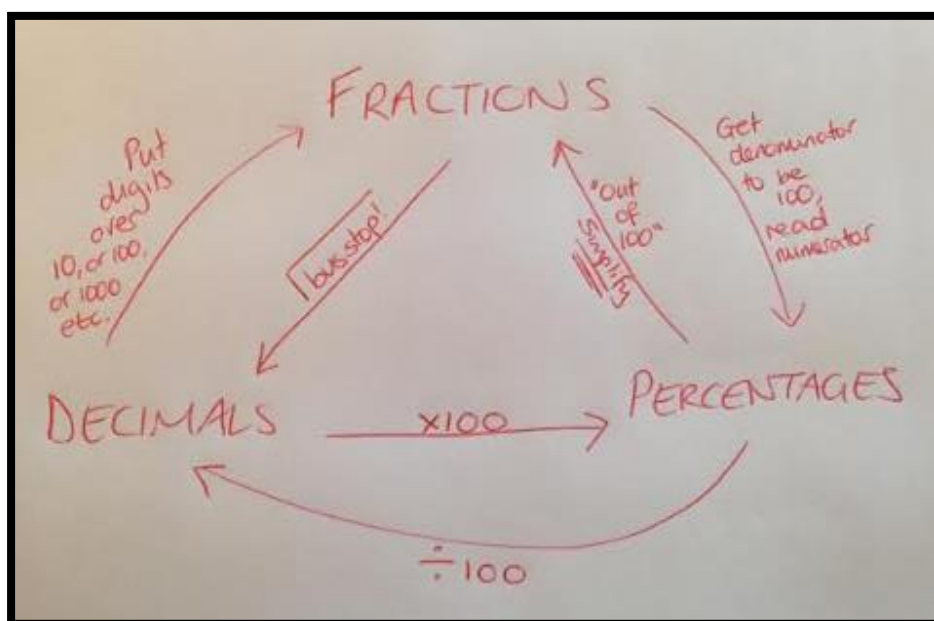
## **Credits**

WJEC Question bank

<http://www.wjec.co.uk/question-bank/question-search.html>

## Converting from one form to another

Often in exams you will be asked to convert a fraction or decimal or percentage into another form. Use this diagram as an overview of methods needed.



### Decimals to Percentages

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

Examples

Convert 0.35 to a percentage

$$0.35 \times 100 = 35\%$$

Convert 0.06 to a percentage

$$0.06 \times 100 = 6\%$$

Convert 0.7 to a percentage

$$0.7 \times 100 = 70\%$$

Convert 0.564 to a percentage

$$0.564 \times 100 = 56.4\%$$

### Exercise N38

Convert these decimals to percentages

- |         |         |          |
|---------|---------|----------|
| a. 0.45 | d. 0.6  | g. 0.07  |
| b. 0.91 | e. 0.4  | h. 0.451 |
| c. 0.44 | f. 0.02 | i. 0.012 |

### Decimals to Fractions

To convert a decimal to a fraction, count the number of decimal places.

- If there is one decimal place, put it over 10
- If there are two decimal places, put it over 100
- If there are three decimal places, put it over 1000

Examples

*Convert 0.3 to a fraction (0.3 has one decimal place)*

$$0.3 = \frac{3}{10}$$

*Convert 0.21 to a fraction (0.21 has two decimal places)*

$$0.21 = \frac{21}{100}$$

*Convert 0.121 to a fraction (0.121 has three decimal places)*

$$0.121 = \frac{121}{1000}$$

### Exercise N39

Convert these decimals to Fractions

- |         |         |          |
|---------|---------|----------|
| a. 0.45 | d. 0.6  | g. 0.7   |
| b. 0.91 | e. 0.4  | h. 0.451 |
| c. 0.44 | f. 0.23 | i. 0.912 |

### Percentages to Decimals

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

*Convert 16% to a decimal*

$$16 \div 100 = 0.16$$

*Convert 7% to a decimal*

$$7 \div 100 = 0.07$$

*Convert 40% to a decimal*

$$40 \div 100 = 0.40 = 0.4$$

*Convert 13.7% to a decimal*

$$13.7 \div 100 = 0.137$$

### Exercise N40

Convert these percentages to decimals

a. 54%

d. 8%

g. 90%

b. 82%

e. 4%

h. 16.7%

c. 34%

f. 20%

i. 54.9%

### Percentages to Fractions

Percentage means 'out of 100'. So to convert percentages to fractions, put the percentage over 100

Example

*Convert 18% to a fraction*

$$18\% = \frac{18}{100}$$

*Convert 9% to a fraction*

$$9\% = \frac{9}{100}$$

*Convert 12.5% to a fraction*

$$12.5\% = \frac{12.5}{100} = \frac{125}{1000}$$

Don't leave a decimal in a fraction. See 'Simplifying and Equivalent Fractions' for help on this

Exercise N41

Convert these percentages to fractions

a. 45%

d. 8%

g. 90%

b. 82%

e. 4%

h. 16.7%

c. 34%

f. 20%

i. 54.9%

Fractions to Decimals

To convert a fraction to a decimal, use the bus stop method. This is covered in the '*Four Operations and BIDMAS*' booklet

$$\frac{1}{8} = 1 \div 8$$

A handwritten diagram illustrating the bus stop method for converting the fraction  $\frac{1}{8}$  to a decimal. The division is set up as  $8 \overline{) 1.000}$ . The quotient is written above the line as 0.125. The dividend is 1.000, with the decimal point and the first three zeros highlighted in red. Blue arrows indicate the process: one arrow from the 1 to the first 0, and three arrows from the subsequent 0s to the next digits in the quotient (1, 2, and 5).

Exercise N42

Convert these fractions to decimals.

a.  $\frac{3}{8}$

d.  $\frac{7}{20}$

g.  $\frac{3}{20}$

b.  $\frac{5}{8}$

e.  $\frac{1}{5}$

h.  $\frac{9}{50}$

c.  $\frac{3}{4}$

f.  $\frac{17}{40}$

i.  $\frac{12}{100}$

## Fractions to percentages

To convert a fraction to a percentage, you can use one of two methods;

1. Use **bus stop** method to turn the fraction into a decimal, then multiply by 100 to turn that into a percentage
2. Remember: Percentages are 'out of 100'. Use equivalent fractions to get the denominator to be 100

Example of method 1

$$\frac{9}{20} = 0.45$$
$$0.45 \times 100 = 45\%$$

Example of method 2

$$\frac{9}{20} = \frac{9(\times 5)}{20(\times 5)} = \frac{45}{100} = 45\%$$

*This was a more simple example, because to get the denominator to be 100 we only have to multiply it by 5*

More difficult example of method 2

$$\frac{9}{15} = \frac{9(\div 3)}{15(\div 3)} = \frac{3}{5} = \frac{3(\times 20)}{5(\times 20)} = \frac{60}{100} = 60\%$$

*This example is more difficult because there you can't multiply 15 by a number to get 100. We simplify first to get the denominator to be a **factor** of 100*

**Exercise N43**

Convert the following fractions to percentages

a.  $\frac{13}{25}$

d.  $\frac{13}{20}$

g.  $\frac{4}{10}$

b.  $\frac{24}{50}$

e.  $\frac{7}{20}$

h.  $\frac{2}{5}$

c.  $\frac{4}{5}$

f.  $\frac{9}{25}$

i.  $\frac{15}{45}$

**Ordering and Comparing**

The reason we need to convert between the different forms is to compare fractions, decimals, and percentages to decide which values are bigger than other values.

**Example 1**

*Which is larger,  $\frac{1}{8}$  or 13%*

To compare these two quantities we need to convert them to the same form. Most commonly, converting to decimals makes for easiest comparison

$$\frac{1}{8} = 0.125$$

$$13\% = 0.13$$

So now we can see that 13% is bigger .

**Example 2**

*Write  $\frac{3}{8}$ , 30%, and 0.4 in order from smallest to biggest*

$$\frac{3}{8} = 0.375$$

$$30\% = 0.3$$

$$0.4 = 0.4$$

So in order: 30%,  $\frac{3}{8}$ , 0.4



## Exam Questions N25

1. Complete the following table.

Fraction	Decimal	Recurring decimal? Yes or No	Terminating decimal? Yes or No
$\frac{2}{5}$			
$\frac{5}{8}$			
$\frac{7}{9}$			
$\frac{2}{11}$			

2. (a) Draw a circle around all of the following fractions that are equal to 40%. [2]

$$\frac{8}{20} \quad \frac{1}{4} \quad \frac{2}{5} \quad \frac{10}{40} \quad \frac{5}{20}$$

3. (b) Circle **three** of the following that have the same value as  $\frac{2}{10}$ . [3]

$$20\% \quad 0.002 \quad 0.02 \quad 5$$

$$0.2 \quad 2\% \quad \frac{1}{5}$$

4. **Showing all your working**, find which of the quantities 64%,  $\frac{5}{8}$  and 0.66 is (i) the smallest, (ii) the largest.

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- (i) Smallest = ..... (ii) Largest = ..... [3]

**Showing all your working**, find which of the quantities 0.58, 65% and  $\frac{3}{5}$ , is (i) the smallest, (ii) the largest.

5.

.....

.....

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(i) Smallest = ..... (ii) Largest = ..... [3]

6. **Showing all your working**, find which of the quantities 0.3,  $\frac{3}{8}$  and 34% is (i) the smallest, (ii) the largest.

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(i) Smallest = ..... (ii) Largest = ..... [3]

7. **Showing all your working**, write  $\frac{1}{2}$ ,  $\frac{5}{8}$ , and  $\frac{3}{4}$  in order, starting with the largest. [3]

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