

What do I need to be able to do?

You should be able to:

- Convert fluently between fractions, decimals and percentages
- Order fractions, decimals and percentages
- Know the key FDP equivalences

HIGHER TIER ONLY

- Convert recurring decimals into fractions

FDP EQUIVALENCE

Key Words

- Percent: parts per hundred
- Fraction: how many parts out of a whole
- Decimal: a number with a decimal point used to separate ones, tenths, hundredths etc...
- Tenth: one whole split into 10 parts
- Equivalent: of equal value
- Recurring decimal: a decimal number with a digit that repeats forever

Percentages to Decimals

Convert 37% to a decimal

Remember this means 37 out of 100 or 37 hundredths. If 1 hundredth is 0.01, 37 hundredths would be **0.37**

$$\begin{array}{ll} 12\% = 0.12 & 123\% = 1.23 \\ 85\% = 0.85 & 0.1\% = 0.001 \end{array}$$

Percentage $\rightarrow$ Decimal, $\div 100$

Percentages to Fractions

Convert 37% to a fraction

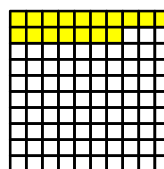
Remember this means 37 out of 100. We can write this as $\frac{37}{100}$ This is fully simplified

$$\begin{array}{ll} 12\% = \frac{12}{100} = \frac{3}{25} & 123\% = \frac{123}{100} = 1\frac{23}{100} \\ 85\% = \frac{85}{100} = \frac{17}{20} \end{array}$$

Percentage $\rightarrow$ Fraction, write over 100 and then simplify

Visual aids

Sometimes, it can be helpful to draw a diagram to help understand what is happening



Here are 100 squares. I have 17 yellow squares.

The fraction of yellow squares is $\frac{17}{100}$

The percentage of yellow squares is 17%

Decimals to Percentages

Convert 0.63 to a percentage

0.63 is equal to 6 tenths plus 3 hundredths or 63 hundredths. So **0.63 = 63%**

$$\begin{array}{ll} 0.23 = 23\% & 0.535 = 53.5\% \\ 0.02 = 2\% & 2.13 = 213\% \end{array}$$

Decimal $\rightarrow$ Percentage, $\times 100$

Decimals to Fractions

Convert 0.63 to a fraction

0.63 is equal to 6 tenths plus 3 hundredths or 63 hundredths. We can write this as $\frac{63}{100}$

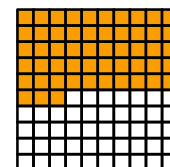
$$\begin{array}{ll} 0.23 = \frac{23}{100} & 0.535 = \frac{535}{1000} = \frac{107}{200} \\ 0.02 = \frac{2}{100} = \frac{1}{50} \end{array}$$

Here we have 5 tenths, 3 hundredths and 5 thousandths or 535 thousandths

Always make sure that you fully simplify your fraction!

I want to make 0.53 of this big square orange.

So I want to make 53 hundredths orange. This is the same as 53% or $\frac{53}{100}$

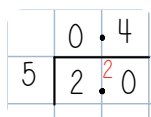


Fractions to Decimals

Convert $\frac{2}{5}$ to a decimal

Remember a divide symbol is an empty fraction, so this is the same as $2 \div 5$

= 0.4



Remember

$$\frac{1}{10} = 0.1 \quad \frac{1}{4} = 0.25 \quad \frac{1}{2} = 0.5$$

Fractions to Percentages

Convert $\frac{2}{5}$ to a percentage

Here we need to be confident with equivalent fractions. We know percent means out of 100 so we need to find an equivalent fraction with a denominator of 100.

$$\frac{2}{5} = \frac{40}{100} = \mathbf{40\%}$$

Recurring Decimals to Fractions

HIGHER TIER ONLY

Example (ONE RECURRING DIGIT)

Convert $0.\dot{3}$ to a fraction

$$\begin{array}{rcl} x & = & 0.3333... \\ 10x & = & 3.3333... \end{array}$$

$$10x - x = 9x$$

$$9x = 3 \rightarrow x = \frac{3}{9} = \frac{1}{3}$$

$$3.333... - 0.333... = 3$$

Example (TWO RECURRING DIGITS)

Convert $0.\dot{3}\dot{5}$ to a fraction

$$\begin{array}{rcl} x & = & 0.353535... \\ 100x & = & 35.353535... \end{array}$$

Because we have two digits that are repeating, we need to multiply it by 100!

$$99x = 35 \rightarrow x = \frac{35}{99}$$

Ordering FDP

Put in ascending order, $0.3, \frac{1}{3}, 0.303, 35\%, \frac{31}{100}$

Remember ascending means from smallest to largest

1. Choose a form to compare them in, here let's choose to compare them as decimals
 $0.3, 0.\dot{3}, 0.303, 0.35, 0.31$
2. Put them in ascending order: $0.3, 0.303, 0.31, 0.\dot{3}, 0.35$
3. Convert them back to their original form
 $0.3, 0.303, \frac{31}{100}, \frac{1}{3}, 35\%$

Key FDP Equivalences

www.cazoommaths.com

You are expected to know some of the key FDP equivalences without working them out

Decimal	Percentage	Fraction
0.5	50%	$\frac{1}{2}$
0.25	25%	$\frac{1}{4}$
0.75	75%	$\frac{3}{4}$
0.2	20%	$\frac{1}{5}$
0.1	10%	$\frac{1}{10}$
$0.\dot{3}$	33.3%	$\frac{1}{3}$

Example

Convert $0.2\dot{5}$ to a fraction

$$\begin{array}{rcl} x & = & 0.255555... \\ 10x & = & 2.555555... \\ 100x & = & 25.555555... \end{array}$$

Here, we cannot just take 2555 away from 0.255 as we will not reduce it to an integer

$$100x - 10x = 90x$$

$$90x = 23 \rightarrow x = \frac{23}{90}$$

$$25.555... - 2.555... = 23$$