How much do I know?

5. Number

**Try this first:**

20% of the pupils in a class fail a test, while 32 pupils pass.

How many pupils are there in the class?

**Answer:**

40.

If 20% fail, then 80% must pass.

So 32 pupils represent 80%.

Dividing by 8, 4 pupils represent 10%, so 100% must be 4 x 10 = 40.

**What is this topic?**

Number covers the following topics:

* Number and place value
* Addition and subtraction
* Multiplication and division
* Fractions, decimals and percentages
* Ratio and proportion
* Measurement

These topics are covered in Section C of **Mathematics Explained for primary teachers** by Derek Haylock, pages 63 to 219.

Ratio and proportion have been covered by a separate “How much do I know?” section.

Number and place value, addition and subtraction, and measurement are straightforward topics and can be covered by reading the sections from the Derek Haylock book as above.

This “How much do I know” section is therefore dedicated to Fractions, decimals and percentages.

**What is this topic?**

**Fractions** consist of a numerator (the number on the top) and a denominator (the number on the bottom). An improper fraction (also known as a top-heavy fraction) has a bigger number on the top than on the bottom. A mixed number has a whole number part and a fraction part.

To add or subtract fractions, the denominators must be the same. You use equivalent fractions to make them the same if necessary. To multiply fractions, just multiply the numbers on the top, and then multiply the numbers on the bottom. To divide one fraction by another, turn the second one upside down and multiply.

To compare fractions, you must use equivalent fractions to make the denominators the same. Alternatively you can convert them to decimals or percentages (see below).

To find a fraction of a quantity, multiply by the number on the top and divide by the number on the bottom.

**Decimals** consist of a whole number part (or zero) followed by a decimal point and a number of decimal places. To add or subtract decimals, you must line up the decimal points. If the numbers have a different number of decimal places, it is useful to make them all the same by adding zeroes (remember that e.g. 5.4 is the same as 5.40 or 5.400). This is also useful when comparing decimals.

**Percentages** are always out of 100. To find a percentage of an amount, convert to a decimal (by dividing by 100) and then multiply.

A very common type of question asks you to compare numbers in different formats – some fractions, some decimals, some percentages. You must convert them all to the same format; usually decimals are the easiest. To convert a fraction to a decimal, divide the top number by the bottom. To convert percentages to decimals, divide by 100. To covert a fraction to a percentage, change it to an equivalent fraction with a denominator of 100. The numerator will give the percentage.

**Questions**

**1.** There are 500 trees in a forest. $^{1}/\_{10}$ of the trees are oak trees, 25% are larch trees and the rest are pine trees.

 How many pine trees are there in the forest?

 What fraction of trees in the forest are pine trees? Give your answer in its simplest form.

**2.** Put the following in order, starting with the smallest.

 22% $^{9}/\_{50}$ 0.19 $^{1}/\_{5}$

**3.** Ben bought a pair of jeans in a sale that advertised “25% off”. If the jeans cost £45, what was the original price?

**Answers**

**1.** $^{1}/\_{10}$ of 500 is 50, so there are 50 oak trees.

 25% is a quarter, and a quarter of 500 is 125.

 50 + 125 = 175 and 500 – 175 = 325.

 So there are 325 pine trees.

 $^{325}/\_{500}$ cancels down to $^{13}/\_{20}$.

**2.** Converting to decimals, 22% = 0.22, $^{9}/\_{50}$ = $^{18}/\_{100}$ = 0.18, and $^{1}/\_{5}$ = 0.2 (or 0.20).

 So from smallest to largest, the order is:

 $^{9}/\_{50}$, 0.19, $^{1}/\_{5}$, 22%.

**3.** 25% off means 75% “on”, i.e. the jeans cost $^{3}/\_{4}$ of the original price.

 If £45 represents three quarters, then one quarter is £45 $÷$ 3 = £15, so the original price was four quarters, i.e. 4 x £15 = £60.