Y8 Maths Knowledge Organiser Topic 3: Fractions 2

What must I be able to do?

You may need to revise the following:

- Year 7 Topic 8: Fractions 1

New content:

- ☐ Convert between improper fractions and mixed numbers
  - ➢ Sparx M601
- ☐ Add and subtract fractions including mixed numbers and improper fractions
  - ➢ Sparx M835, M931
- ☐ Use fractions within other topics e.g. area or perimeter
- ☐ Use a calculator to calculate with fractions

Key vocabulary

Mixed number	A combination of an integer and a fraction. Used to represent a fractional total worth more than one whole.
Improper fraction	A fraction where the numerator is larger than the denominator.

Improper fractions and mixed numbers

e.g. $\frac{11}{4} = 2\frac{3}{4}$

You do 11 ÷ 4 → 4 goes into 11 twice

It has a remainder of 3

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e.g. $3\frac{2}{5} = \frac{17}{5}$

There are 15 fifths in three wholes (3 x 5)

15 + the extra 2 fifths makes 17 fifths

Multiplying and dividing mixed numbers

In order to multiply or divide with mixed numbers they first need to be converted to improper fractions.

e.g. $5\frac{3}{7} \times 4\frac{1}{2} = \frac{38}{7} \times \frac{9}{2} = \frac{\cancel{38}^{19}}{7} \times \frac{9}{\cancel{2}_{1}} = \frac{171}{7} = 24\frac{3}{7}$

With mixed numbers we sometimes have large numbers to multiply. Look to see if you can cancel diagonally across the multiply sign before doing the multiply. Here, 38 and 2 both divide by 2 to leave 19 and 1.

Division is done the same way as normal. Rewrite the mixed number as an improper fraction and then multiply by its reciprocal instead.

e.g. $3\frac{1}{5} \div 1\frac{4}{5} = \frac{16}{5} \div \frac{9}{5} = \frac{16}{5} \times \frac{5}{9} = \frac{80}{45} = \frac{16}{9} = 1\frac{7}{9}$ (Simplify by ÷ 5)

The reciprocal of $\frac{9}{5}$ is $\frac{5}{9}$

Adding and subtracting mixed numbers

When adding or subtracting fractions, you can do the whole number and the fraction part separately. The fraction part will still need a common denominator and you may be left with an improper or negative fraction to simplify at the end.

e.g. $4\frac{2}{3} + 3\frac{2}{5}$

4 + 3 = 7 (Add the integers)

and $\frac{2}{3} + \frac{2}{5}$ (Add the fractions)

x5, x3

$= \frac{10}{15} + \frac{6}{15} = \frac{16}{15} = 1\frac{1}{15}$ (Convert into a mixed number)

So $7 + 1\frac{1}{15} = 8\frac{1}{15}$ (Add the 2 answers together)

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e.g. $3\frac{1}{4} - 1\frac{2}{3}$

3 − 1 = 2 (subtract the integers)

and $\frac{1}{4} - \frac{2}{3}$ (subtract the fractions)

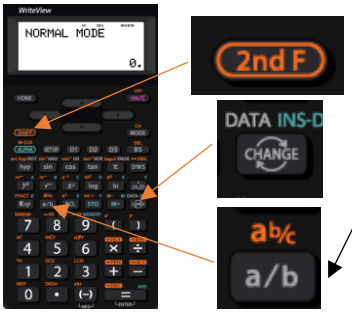
x3, x4

$= \frac{3}{12} - \frac{8}{12} = \frac{-5}{12}$ ← The fraction is negative so needs subtracting from the remaining integers

So $2 - \frac{5}{12} = 1\frac{7}{12}$

There are 12 twelfths in a whole one so if we subtract 5 twelfths we must have 7 twelfths remaining from that whole.

Using a calculator for fractions



This is the fraction button. It allows you to write fractions on the calculator which will display like this: $\frac{2}{3}$

In order to write a mixed number you need to put the whole number in first, then press the 2nd F button followed by the fraction button. Now put in the fractional part of the mixed number: $6\frac{3}{4}$

The change button will convert between mixed numbers, improper fractions and their decimal equivalent: $7\frac{7}{20}$ $\frac{147}{20}$ 7.35