Proper and Improper Fractions

Proper fractions

A proper fraction is a fraction where the numerator is smaller than the denominator.
Fractions prefer this and so we say they are "proper".

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

If the numerator is the same as the denominator or a multiple of the denominator, then you have a whole number.

eg $\frac{4}{4} = 1$ or $\frac{24}{4} = 6$

Improper fractions

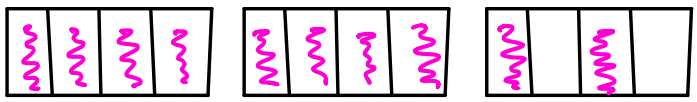
An improper fraction is one where the numerator is larger than the denominator.

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

Mixed numbers

A mixed number is a combination of a whole number and a proper fraction.
We usually convert an improper fraction to a mixed number and then reduce or simplify the proper fraction.

Converting improper fractions to mixed numbers

1) 

Each whole is divided into 4 pieces. So, the denominator is 4. There are 10 pieces coloured. So, the improper fraction is:

$\frac{10}{4} = 2\frac{2}{4}$ ← and two quarters/fourths.

↑ two wholes

$= 2\frac{1}{2}$ (because $\frac{2}{4} \div 2 = \frac{1}{2}$)

2) $\frac{17}{3} = ?$ mixed number

Step 1: divide the numerator by the denominator. $17 \div 3 = 5$ R 2

So, 5 = wholes

2 = numerator of your fraction.

Answer: $\frac{17}{3} = 5\frac{2}{3}$ (You can't reduce 2/3).

3) $\frac{16}{4} = ?$

Divide the numerator by the denominator.

$16 \div 4 = 4$ (no remainders)

So, $\frac{16}{4} = 4$

4) $\frac{51}{7} = ?$

Divide 51 by 7 = 7 remainder 2

So, $\frac{51}{7} = 7\frac{2}{7}$

Have you noticed that you REALLY need to know your multiplication tables?

Mixed numbers to improper fractions

You won't have to do this as often but should know how to convert in the opposite direction.

$3\frac{3}{4}$ = ? as an improper fraction.

Step 1. The denominator stays the same. (4 here)

Step 2. We know that each whole is made up of the denominator number. (In this case $1 = \frac{4}{4}$). So, multiply the whole number you have by the denominator you have.

Step 3. Add in the "extras" of your proper fraction (3 here)

$3\frac{3}{4} = \frac{\quad}{4}$ (step 1)

$= \frac{12 + \quad}{4}$ 3 wholes $\times 4 = 12$ (step 2)

$= \frac{12+3}{4}$ add in $\frac{3}{4}$ (step 3)

$= \frac{15}{4}$ ← final answer.

OR $\left(3\frac{3}{4} = (3 \times 4) + 3 = \frac{15}{4}\right)$