

### Adding mixed numbers

Add the whole numbers and then add the fraction parts

$$2\frac{2}{3} + 3\frac{4}{5} = 5 + \frac{2}{3} + \frac{4}{5}$$

Find the **LCM of the denominators** to find a common denominator.

$$\frac{2}{3} + \frac{4}{5}$$

Use equivalent fractions to change each fraction to the **common denominator**.

$$= \frac{10}{15} + \frac{12}{15} = \frac{22}{15} = 1\frac{7}{15}$$

Then just **add the**  $2\frac{2}{3} + 3\frac{4}{5} = 6\frac{7}{15}$



### Year 11 foundation topic 18

Fractions, indices and standard form

### Subtracting mixed numbers

Either use the same method as adding mixed numbers or convert both fractions to top heavy.

$$\begin{aligned} 9\frac{1}{2} - 5\frac{1}{4} &= \frac{19}{2} - \frac{21}{4} && \text{Change to improper fractions} \\ &= \frac{19 \times 2}{2 \times 2} - \frac{21}{4} && \text{Change to common denominator} \\ &= \frac{38}{4} - \frac{21}{4} && \text{Subtract the numerators} \\ &= \frac{17}{4} = 4\frac{1}{4} && \text{Change to mixed numbers} \end{aligned}$$

Standard form Standard form is a way of expressing very large or very small numbers. Standard form must be written in the form  $a \times 10^b$  and must be between 1 and 10. Example:  $0.000000541 = 5.41 \times 10^{-7}$

$$123000000 = 1.23 \times 10^8$$

### Laws of indices

$$\begin{aligned} \bullet x^0 &= 1 && \bullet x^n \div x^m = x^{n-m} \\ \bullet x^{-n} &= \frac{1}{x^n} && \bullet (x^n)^m = x^{n \cdot m} \\ \bullet x^n \cdot x^m &= x^{n+m} && \bullet x^{\frac{n}{m}} = \sqrt[m]{x^n} \end{aligned}$$

### Multiplying mixed numbers

$$1\frac{3}{8} \times 3 = \frac{11}{8} \times \frac{3}{1} = \frac{33}{8} = 4\frac{1}{8}$$

### What careers would use these skills?

Any careers that involves money, rates or very big/small numbers including sales, transport, engineering, science, cooking, farming, machinery, astronomy, travel, design...

### Know how to use your calculator!

Check you know how to type in calculations in YOUR calculator and then read the answer. Always check you have written your answer how the question asks for—in standard form or as an ordinary number, as a top heavy fraction or mixed number.

### Dividing mixed numbers

1. Convert all mixed numbers to improper fractions.

$$2\frac{1}{3} \div 3\frac{2}{5} = \frac{7}{3} \div \frac{17}{5}$$

$$\begin{aligned} 2. \text{ Change } \div \text{ to } \times &= \frac{7}{3} \times \frac{5}{17} \\ 3. \text{ Flip the divisor.} & \\ 4. \text{ Multiply.} &= \frac{35}{51} \\ 5. \text{ Simplify.} & \end{aligned}$$

### Multiply and dividing numbers in standard form

$$\begin{aligned} 3.5 \times 10^4 \times 2 \times 10^5 &= \\ (3.5 \times 2) \times 10^{(4+5)} &= \\ 7 \times 10^9 & \end{aligned}$$

$$\begin{aligned} 4.8 \times 10^7 \div 2 \times 10^5 &= \\ (4.8 \div 2) \times 10^{(7-5)} &= \\ 2.4 \times 10^2 & \end{aligned}$$

### Adding and subtracting numbers in standard form

$$\begin{aligned} (3 \times 10^8) + (2 \times 10^6) & \\ \text{Firstly convert both numbers to have the same power of 10...} & \\ (3 \times 10^8) + (0.02 \times 10^8) & \\ \text{Now add together the whole numbers and keep the power of 10 the same.} & \\ = 3.02 \times 10^8 & \end{aligned}$$

BE CAREFUL!  
Sometimes this number won't be in standard form so you will need to convert.

Do the same for subtraction but take away instead