

Key Vocabulary

Proper fraction	A fraction where the numerator is smaller than the denominator e.g. $2/3$
Improper fraction	A fraction where the numerator is bigger than the denominator e.g. $5/2$ Also known as a vulgar or top-heavy fraction
Mixed Number	A whole number and fraction together, e.g. $2\frac{1}{2}$ Improper fractions can be changed to mixed numbers and back again. $5/2 = 2\frac{1}{2}$
Equivalent Fractions	Two fractions that represent the same amount. Multiplying or dividing the top and bottom of a fraction by the same number gives an equivalent fraction. Dividing gives a simpler fraction
Percentage	A value out of 100. E.g. $23\% = 23/100 = 0.23$
Increase	Make a value bigger by a given fraction or percentage
Decrease	Make a value smaller by a given fraction or percentage
Multiplier	A decimal that can be used to multiply a given value to give the result of a percentage increase or decrease

Key facts / Diagrams

$2\frac{1}{4} = 9/4$
 $2 \times 4 = 8$ $8 + 1 = 9$
 Total = 9 quarters = $9/4$

Change $11/3$ to a mixed number:
 $11 \div 3 = 3$ remainder $2 = 3\frac{2}{3}$

$50\% = \frac{1}{2} = \div 2$
 $25\% = \frac{1}{4} = \div 4$
 $75\% = \frac{3}{4} = \div 4$ then $\times 3$
 $10\% = \frac{1}{10} = \div 10$
 $20\% = \frac{1}{5} =$ either $\div 5$ or find 10% and $\times 2$
 $5\% = \frac{1}{20} =$ either $\div 20$ or find 10% and $\div 2$

20% increase = original $100\% + 20\% = 120\%$
 20% decrease = original $100\% - 20\% = 80\%$
 $\frac{1}{4}$ increase = original $+ \frac{1}{4} = 5/4$
 $\frac{1}{4}$ decrease = original $- \frac{1}{4} = \frac{3}{4}$

Common misconceptions

- You can't have more than 100%. Not realising that while in real life contexts over 100% might not make sense, but through a percentage increase you can have over 100%.
- When asked to multiply a fraction by a whole number, e.g. multiply $\frac{3}{4}$ by 2, multiplying top and bottom by 2 and just getting an equivalent fraction.
 Proper method: $2 \times \frac{3}{4} = \frac{2}{1} \times \frac{3}{4} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$
- When multiplying two fractions, thinking you need to start by changing them to fractions with the same denominator.

Worked examples

Increase £200 by $1/4$:
 Find $1/4$ of £200 = $\pounds 200 \div 4 = \pounds 50$
 $\pounds 200 + \pounds 50 = \pounds 250$
 OR: $\pounds 200 \times 5 \div 4 = \pounds 1,000 \div 4 = \pounds 250$
 OR: $\pounds 200 \div 4 \times 5 = \pounds 50 \times 5 = \pounds 250$

Decrease £300 by 20%
 This leaves 80%.
 Find 10%: $\pounds 300 \div 10 = \pounds 30$
 $80\% = \pounds 30 \times 8 = \pounds 240$
 OR: $\pounds 300 \times 0.8 = \pounds 240$

Increase 40m by 30%
 Multiplier = 1.3
 $40 \times 1.3 = 52\text{m}$