



Year 7 Knowledge Organiser -

Fractions, decimals and percentages

- Objectives
- Order positive and negative integers, decimals and fractions.
 - Express one quantity as a fraction of another, where the fraction is less than 1 or greater than 1
 - Add, subtract, multiply and divide with fractions and mixed numbers.
 - Interpret percentages and percentage changes as a fraction or a decimal, and interpret these multiplicatively
 - Express one quantity as a percentage of another
 - Compare two quantities using percentages
 - Solve problems involving percentage change, including percentage increase/decrease
 - Interpret fractions and percentages as operators

Key Vocabulary

- Improper fraction - numerator more than denominator
- Proper fraction - a fraction less than one with the numerator less than the denominator
- Proportion - a statement where two ratios or fractions are equal.
- Mixed number - a whole number and fraction combined
- Equivalent fraction - fractions which have the same value but look different
- Simplify, cancel, lowest terms - a fraction is in its simplest form if 1 is the only common factor of its numerator and denominator
- Percent, percentage - number of parts per 100
- Multiplier - a more efficient method for calculating a percentage increase or decrease. It involves finding a number you can multiply by that represents the percentage change.

Expressing quantities as fractions...

e.g. Express 50ml as a fraction of 200ml
 50ml out of 200ml $\rightarrow \frac{50}{200}$
 Simplify your answer $\frac{50}{200} = \frac{1}{4}$

e.g. Express 50 minutes as a fraction of 3 hours
 (Careful! The units are not the same - convert first!)
 50 minutes out of 180 minutes $\rightarrow \frac{50}{180} \rightarrow \frac{5}{18}$

Multiplying your decimal by 100 will convert it into a percentage.
 Remember 'per cent' means parts per hundred.

Expressing quantities as percentages...

e.g. Express 50ml as a percentage of 200ml
 $\frac{50}{200} \times 100 = 25\%$

Ordering FDP...

Convert all your values into the same format, then order.
 Make sure in the answer box to write the original values.

+ and - fractions

- Convert mixed numbers to improper
- Find the LCM of the denominators
- + or - the numerators (denominator stays the same)
- Simplify and convert back to mixed number where possible

Convert FDP

70/100 \rightarrow This also means 70 - 100 \rightarrow 70 out of 100 squares \rightarrow 70 "hundredths" - 7 "tenths" 0.7 \rightarrow 70 hundredths = 70%

Using a calculator \rightarrow $\frac{70}{100} = 0.7$ \rightarrow Convert to a decimal \rightarrow * 100 converts to a percentage

This will give you the answer in the simplest form

Be careful of recurring decimals
 e.g. $\frac{1}{3} = 0.3333333$
 $\frac{3}{3} = 0.3$
 The dot above the 3

Dividing fractions

$\frac{2}{5} \div \frac{3}{4}$
 $\frac{2}{5} \times \frac{4}{3}$

Multiplying by a reciprocal gives the same outcome.

Tip: Convert mixed number fractions to improper fractions first!

Multiplying fractions

$\frac{2}{5} \times \frac{7}{9}$
 $\frac{12}{5} \times \frac{16}{9} = \frac{192}{45}$

Simplify and convert back to mixed number where possible

$\frac{192}{45} = \frac{64}{15} = 4 \frac{4}{15}$

Percentage decrease: Multipliers

100% \rightarrow 42% \rightarrow Decrease by 58%

$100\% - 58\% = 42\%$ \rightarrow Multiplier Less than 1
 $100 - 58 = 0.42$

Percentage increase: Multipliers

100% \rightarrow 12% \rightarrow Increase by 12%

$100\% + 12\% = 112\%$ \rightarrow Multiplier More than 1
 $100 + 12 = 112$

Comparing quantities using percentages...

Example problem: "Rosie scores 24 out of 60 in her first test and 12 out of 40 in her second test. Which test did she score best in?"

Step 1 Convert both scores into percentages (this is easiest as the tests are out of different marks)

$\frac{24}{60} \times 100 = 40\%$ $\frac{12}{40} \times 100 = 30\%$

Step 2 Compare the percentages to give your answer to the question.

Percentage change...

$\frac{\text{Difference in value}}{\text{Original value}} \times 100$

Percentage loss
 e.g. $\frac{75}{200} \times 100 = 37.5\%$

Percentage profit
 Money made (profit value) $\frac{36000}{180000} \times 100 = 20\%$

I bought a phone for £200. A year later sold it for £125.

I bought a house for £180,000, I later sold it for £216,000.