Essential Maths Skills

for AS/A-level

Economics

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The listed content is assessed by the awarding bodies AQA, OCR, Pearson Edexcel and WJEC at AS and A-level. **The content listed in bold is only specified to be assessed at AS level by OCR.**

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2 Percentage and percentage change

Percentage

A percentage is a number expressed as a fraction of 100. For example, 40% can be expressed as $\frac{40}{100}$ and vice versa.

In economics percentages can be used to compare data more precisely, as well as help understand topics such as interest rates and taxation.

To calculate the percentage you take the fraction and multiply by 100. For example, two parts out of a total of five can be converted to a percentage as follows:

$$\frac{2}{5} \times 100 = 40\%$$

You can also find a percentage of a number. For example, if you wanted to know 40% of £270 you would convert 40% into a fraction of 100 and multiply it by £270.

$$40\% = \frac{40}{100}$$

$$\frac{40}{100} \times £270 = £108$$

A Worked examples

a In a large city there are 400 000 people in the working population but 25 000 are currently unemployed. Calculate the percentage of the working population that are unemployed.

Divide the number of unemployed workers (25 000) by the working population (400 000) and then multiply by 100.

$$\frac{25\,000}{400\,000} \times 100$$

$$= 0.625 \times 100$$

$$= 6.25\%$$

b In 2015, total takeaway sales revenue in a seaside town was £30 500 000. One fish and chip shop managed to gain 45% market share. Calculate the sales revenue of the fish and chip shop in 2015.

In this question you are given the percentage of sales revenue (i.e. market share) for the fish and chip shop and you can use this to work out its sales revenue in 2015.

Convert 45% into a fraction of 100 and then multiply it by the total sales revenue in the town (£30 500 000).

$$45\% = \frac{45}{100}$$

$$\frac{45}{100} \times £30\,500\,000$$

$$= £13\,725\,000$$

B Guided questions

Copy out the workings and complete the answers on a separate piece of paper.

1 The top four firms in a market have market shares of 45%, 20%, 15% and 4% respectively. The other firms have 16% of the market. Calculate the three-firm concentration ratio for this market.

- A concentration ratio shows how much market share the top firms have in the market.
- A three-firm concentration ratio means the top three firms in the market.
- Be careful not to include 'other firms' as this is many firms, not a single firm.

Add the market shares of the top three firms together.

= 45% + 20% + _____ %

= _____

2 Mitchell put £2500 into his savings account at the start of the year. His bank manager has offered him 2% annual interest, paid at the end of the year. Calculate Mitchell's bank balance at the end of the year.

Mitchell will get 2% interest on £2500.

Step 1: convert 2% to a fraction of 100 and multiply it by his savings.

$\frac{2}{100} \times$ £2500 _____

Step 2: add this to his original savings of £2500 in order to find his final bank balance.

= _____ + £2500

= _____

3 According to HM Treasury, in 2015–2016 the government will spend £743 billion in total. Some key areas of spending are shown in Table 3.1.

Table 3.1

Government spending (2015–2016)	
Education	£99 billion
Healthcare	£141 billion
Defence	£45 billion
Social protection	£232 billion

Giving your answers to three significant figures (3s.f.), calculate the percentage of government spending devoted to:

a Education

Select the Education figure from the table and divide it by total government spending, then multiply by 100.

$\frac{\text{£99 billion}}{\text{£743 billion}} \times$ £100 = _____

Ensure you round your answer to three significant figures.

b Social protection

Repeat the process for Social protection.

4 Catherine earned £14 650 from her job this year and is calculating how much income tax she needs to pay. She will pay no tax on the first £10 000 of her income but the rest of her income is taxed at 20%. Calculate:

a how much income tax Catherine needs to pay

Catherine will only pay tax on income above £10 000, so £4 650 will be taxed at 20%.

$= \_\_\_\_\_$

$= 100 \times (£14\,650 - £10\,000$

$= \_\_\_\_\_$

b the percentage of her income that is taxed

Use your answer to part a to find out the percentage of her total income that is taxed.

C Practice questions

5 A building company calculated that its total costs for 2015 were £1.2 million. Of this, it spent £300 000 on wages and salaries. What percentage of total costs was spent on wages and salaries?

6 A government raised £620 billion tax revenue in 2014–2015 and 30% of this came from corporation tax. Calculate the total amount of corporation tax revenue raised in 2014–2015.

7 A country's GDP is £745 billion. In the current financial year it ran a budget deficit of £54 billion and its national debt is £612 billion. Calculate as a percentage of GDP, the country's:

a budget deficit

b national debt

8 In a country there are 4.5 million people in the working population.

Table 3.2

% of working population	
Unemployed	6
Employed	72
Inactive	22

According to the data provided, calculate the number of workers in the town who are:

a employed

b unemployed

9 A saver has put £10 000 in his savings account. At the end of each year he gains 5% interest. How much will the saver have in his bank account at the end of:

a the first year?

b the second year?

10 In a large town there are four cinemas operating. The figures below show the total revenue of the four cinemas in the first three months of 2015.

Table 3.3

	Total revenue
Watch	£330 500
The Box	£220 750
Le Public Cinéphile	£99 500
Central Cinema	£98 750

Calculate, to the nearest percentage, the three-firm concentration ratio for this industry.