Name	Date started	Target end date

WJEC GCSE Mathematics and Numeracy (Double Award) — Question Pack

Increasing or decreasing a quantity by a percentage, finding percentage change, and using multipliers for repeated change. Sourced from legacy WJEC GC

REVISE
.wales

F1.08 — Percentage change & multipliers

Spec 1.4.8, 1.4.9, 1.4.10 — Unit 1 (calculator allowed)

Increasing or decreasing a quantity by a percentage, finding percentage change, and using multipliers for repeated change. Sourced from legacy WJEC GCSE Mathematics-Numeracy Foundation papers (3300U10/U20) and accessible content from Intermediate papers (3300U30/U40), organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~46 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (31 marks across 14 questions).*

*You are advised to **not** attempt to complete all of this in one sitting.*

ABOUT THIS QUESTION PACK

This is a **focused single-topic practice pack**, not a single mock paper. Questions are organised against the 2025 specification. Questions are ordered chronologically by sitting, with custom-written and SAM questions at the end.

INSTRUCTIONS

Use black ink or black ball-point pen. Show all working — method marks are awarded for clear setup.

A calculator is allowed on every question in this pack (Unit 1 is the calculator-allowed paper).

Percentage change & multipliers — what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 1: calculator-allowed.

Percentage change 1.4.10

- Calculate percentage increase or decrease.
- Express a change as a percentage of the original amount.
- Compare two quantities using percentage change.

Multipliers 1.4.9

- Use a decimal multiplier (1 + R/100) or (1 − R/100) for a single change.
- Chain multipliers for two-step changes (e.g. +VAT then −discount).
- Recognise that successive % changes are not additive.

Apply to context 1.4.8

- Apply % change to money, populations, measurements.
- Interpret % off, sale prices and tax in context.
- State the answer with appropriate units and rounding.

Exam strategy 1.4

- Show the multiplier on the page even if you do the arithmetic on a calculator.
- Sense-check: a 5% rise on £200 should be £210, not £250.
- Be careful with ‘by’ vs ‘to’ in worded questions.

Crib sheet »

Percentage change & multipliers in one page

Quick-reference notes — revisit before each question. Don’t use during the questions.

Percentage change

$$\%\ \text{change} = (\text{new} - \text{old}) \div \text{old} \times 100$$

Positive answer = increase, negative = decrease.

Increase by R%

$$\text{new} = \text{old} \times (1 + \text{R}/100)$$

e.g. increase £80 by 15% → 80 × 1.15 = £92.

Decrease by R%

$$\text{new} = \text{old} \times (1 - \text{R}/100)$$

e.g. decrease £80 by 15% → 80 × 0.85 = £68.

Common multipliers

+10% → × 1.10 · +20% → × 1.20 · +5% → × 1.05.

−10% → × 0.90 · −25% → × 0.75.

VAT & service charge

VAT at 20% → × 1.20.

10% service charge → × 1.10.

Common traps

- Dividing by the new value instead of the old when finding % change.
- Using − sign in the multiplier instead of subtracting from 1.
- Reading ‘reduced by 25%’ as ‘reduced to 25%’.

Examiner only

8. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

In the diagram below, *ABCE* is a square whose perimeter is 28 cm.
CDE is a right-angled triangle whose area is 35 cm^2.

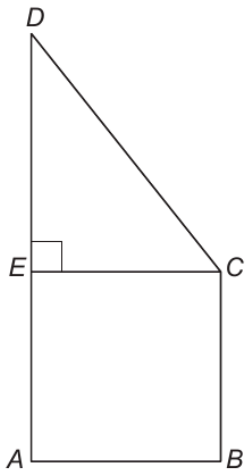

Diagram not drawn to scale

Calculate the length of *DE*.
You must show all your working. [4 + 2 OCW]

Examiner only

8. *(a)* Calculate the approximate difference in length between 1 mile and 1·5 km. Give your answer in metres. [3]

(b) Convert an area of $4\,m^2$ into cm^2. [2]

$4\,m^2 =$ ..... cm^2

Examiner only

10. *(a)* A number is decreased by 12% of its value.
This is done 3 times, each time decreasing the previous value by 12%.
Circle the multiplier that you would use to find the value after the 3 decreases. [1]

$\times 0{\cdot}36$ $\times 0{\cdot}88^3$ $\times 0{\cdot}12^3$ $\times 0{\cdot}3^{12}$ $\times 0{\cdot}3^{88}$

(b) Calculate the percentage change when 42·5 is increased to 45·9. [3]

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11. Display the following information in a Venn diagram. [3]

- Universal Set (ε): Integers between 74 and 80 inclusive.
- Set A: Even numbers.
- Set B: Multiples of 3.

Examiner only

13. Sian thinks of a number.
Its value is increased by 25%.

Express the original number as a percentage of the increased number. [3]

14. Calculate the length of the side *MN* in the triangle *LMN* shown below. [3]

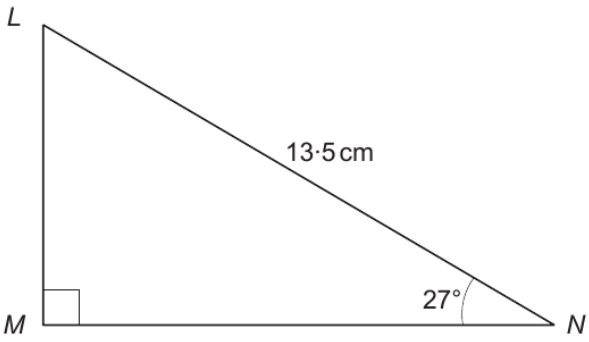

Diagram not drawn to scale

Examiner only

15. *(a)* (i) Expand $x(x^2 + 7)$. [2]

(ii) Expand and simplify $(x - 5)(3x - 4)$. [2]

(b) Sarah buys and sells antique clocks.
On Monday, Sarah had n clocks.
At the end of the day on Tuesday, she had 5 times as many clocks as she had on Monday.
On Wednesday, she sold 27 clocks.

(i) At the end of the day on Wednesday, Sarah had fewer clocks than she had on Monday.
Write an inequality, in terms of n, that shows this information. [2]

(ii) Solve your inequality to find the greatest number of clocks that Sarah could have had on the Monday. [3]

Examiner only

2.

The table below shows the number of visitors to some of the top attractions in Wales in 2017 and 2018.
The table also shows the percentage change in the number of visitors from 2017 to 2018.

Attraction	Number of visitors 2017	Number of visitors 2018	Percentage change
Folly Farm	480 000	455 428	–5·1%
Cardiff Castle	319 131	452 007	+41·6%
Bodnant Garden	255 949	260 153	+1·6%
Caernarfon Castle	204 675	205 009	+0·2%
Conwy Castle	221 652	201 961	–8·9%
Zip World Slate Caverns	190 000	195 000	+2·6%

Use the information in the table above to answer the following questions.

(a) Zip World Slate Caverns had 195 000 visitors in 2018.
Write this number in words. [1]

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(b) Which attraction had the smallest percentage change from 2017 to 2018? [1]

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(c) Calculate the total number of visitors to Bodnant Garden in 2017 and 2018. [2]

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Examiner only

(d) Calculate the difference between the number of visitors to Cardiff Castle in 2017 and the number of visitors to Cardiff Castle in 2018. [2]

(e) Ian looks at the data and says,

"In 2018, Folly Farm had about half a million visitors."

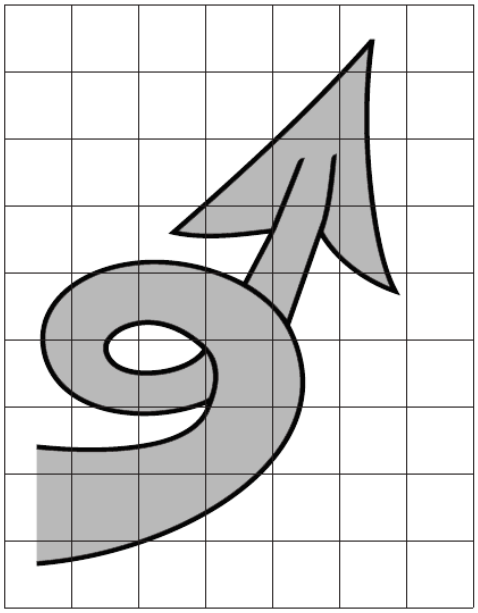
Is Ian correct?
Give a reason for your answer. [1]

Yes ☐ No ☐

Examiner only

(f) A new visitor attraction, Tailspin, wants to use the tail of the dragon from the Welsh flag as its logo.

The tail is drawn on the centimetre square grid below.
Each square on the grid represents an area of 4 cm^2.



Tailspin is planning to make flyers to advertise the attraction.
To print the flyers, the area of the tail must be less than 48 cm^2.

The manager of Tailspin thinks that the area of the tail is greater than 48 cm^2.

Decide whether or not the manager is correct.
You must show all your working. [3]

The manager is:

Correct ☐ Not correct ☐

Examiner only

8. (a) The population of Barbados in 1644 was said to be 30 000.

By 1964, the population of Barbados had increased by 682%.
From 1964 to 2014, the population of Barbados increased by a further 20%.

Calculate the population of Barbados in 2014.
You must show all your working. [3]

(b) The area of Barbados is 432 km^2.
The population of Barbados in September 2019 was 287 106.

Calculate the population density of Barbados in September 2019.
Give your answer correct to 2 significant figures. [3]

(c) The density of some of the sand in Barbados is 1442 kg/m^3.
Express this density in g/cm^3. [2]

END OF PAPER

Examiner only

16. Two times are recorded correct to the **nearest 0·1 second**.

12·4 seconds
25·5 seconds

Calculate the greatest possible difference between these times. [3]

17. A number has been increased by 60% to give an answer of 64.
What was the original number? [2]

Examiner only

15. In the diagram below, AD is a straight line.

$\hat{BAC} = 90°$, $\hat{BDE} = 90°$ and $\hat{CBE} = 90°$.

$AC = 7{\cdot}7$ cm, $BC = 11{\cdot}3$ cm and $BD = 13{\cdot}1$ cm.

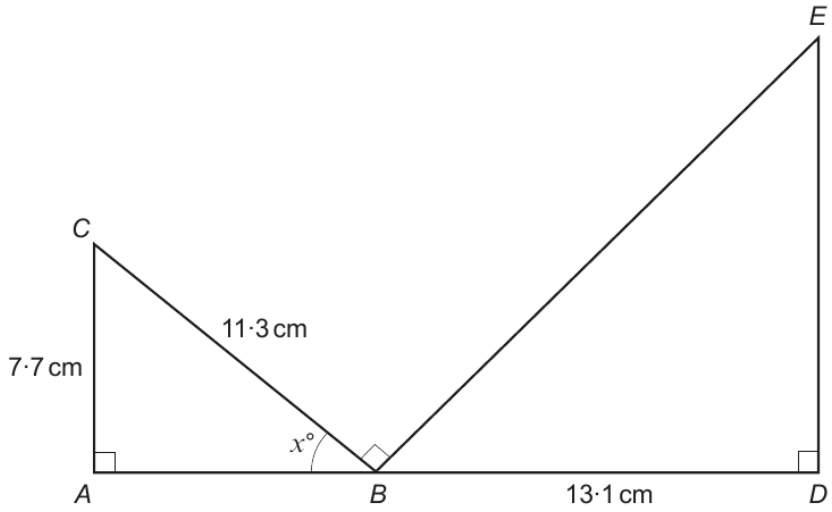


Diagram not drawn to scale

(a) Calculate the value of x. [3]

Examiner only

(b) Hence find the length *DE*. [4]

16. (a) A number is decreased by 5% of its value.
This is done 4 times in total. Each time, the value decreases by 5%.
Circle the multiplier that you would use to find the value after the 4 decreases. [1]

$\times 0{\cdot}05^4$ $\times 0{\cdot}95^4$ $\times 0{\cdot}20$ $\times 1{\cdot}05^4$ $\times 0{\cdot}04^5$

(b) A number has been decreased by 17% to give an answer of 3569.
What was the original number? [3]

Examiner only

9. (a) Maggie sees a Bluetooth speaker in a sale.

The price of the speaker is reduced by 18% in the sale.
The original price of the speaker was £45.

Maggie's mum says she will share the cost of buying this speaker.
The ratio of the amount Maggie's mum pays to the amount Maggie pays is 8 : 1.

Calculate the amount Maggie's mum will pay towards buying this speaker in the sale.
You must show all your working. [4]

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Examiner only

(b) The diagram below shows a flowerbed at Maggie's house.
Maggie's mum will pay her £2.50 per m^2 to weed the flowerbed.

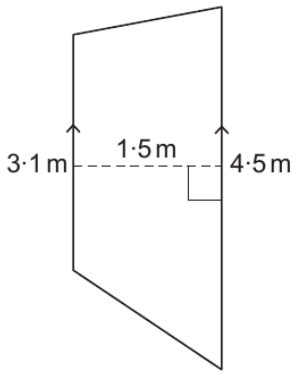

Diagram not drawn to scale

Calculate how much Maggie will get paid for the weeding. [4]

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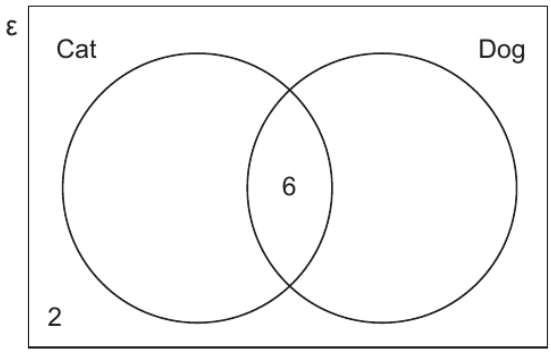
Examiner only

13. In a group of 40 people, some own a cat, some own a dog, and some own both a cat and a dog.
2 people in the group do not own a cat or a dog.

A person is chosen at random from the group.

The probability that the person owns a dog is $\frac{3}{5}$.

Complete the Venn diagram. [3]



Examiner only

14. (a) £285 is decreased by 4%.
This is done 3 times in total.
Each time, the previous value is decreased by 4%.
What calculation would you use to find the value after the 3 decreases?
Circle your answer. [1]

$£285 \times 1{\cdot}04^3$ $£285 \times 0{\cdot}04^3$ $£285 \times 0{\cdot}96^3$ $£285 \times 0{\cdot}6^3$ $£285 \times 0{\cdot}96^2$

(b) A number has been decreased by 10% to give an answer of 34·2.
What was the original number? [2]

Examiner only

9. (a) The area of Wales is 20 735 km^2.

The table below gives the population of Wales in 1977, 1998 and 2015.

Year	1977	1998	2015
Population	2·8 million	2·9 million	3·1 million

(i) What was the increase in the population of Wales between 1977 and 1998? Circle your answer. [1]

1×10^3 1×10^4 1×10^5 1×10^6 1×10^7

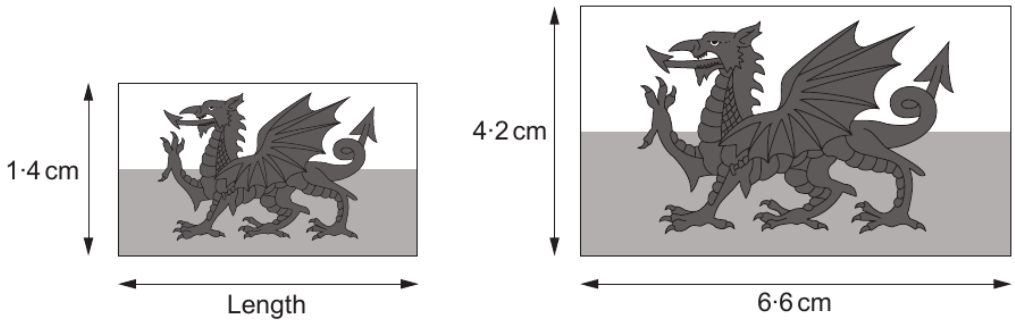
(ii) Estimate the population density of Wales in 2015. [3]

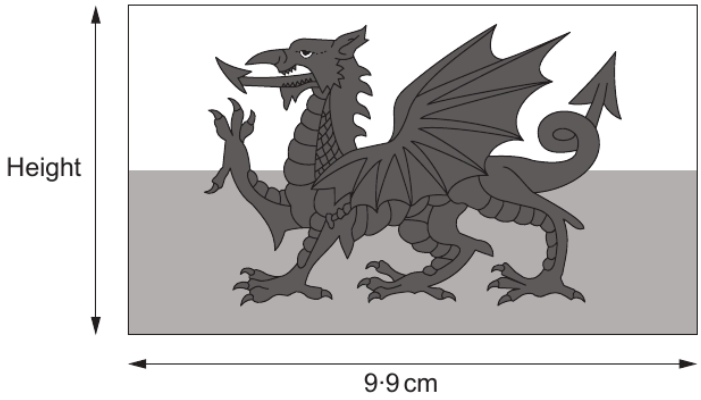
Population density of Wales in 2015 was ..... people / km^2

(b) Cardiff is the largest city in Wales.
In 2018, the population of Cardiff was approximately 360 000.
The population of Cardiff increased by 20% from 1991 to 2018.
Calculate the population of Cardiff in 1991. [3]

Examiner only

(c) DraigYma prints Welsh flags onto stickers.
Three of their mathematically similar Welsh flag stickers are shown below.





Diagrams not drawn to scale

Calculate the missing length and height in the diagrams. [4]

Length is ..... cm Height is ..... cm

END OF PAPER