Name	Date started	Target end date

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

Percentage change, multipliers and reverse percentage. Sourced from legacy WJEC GCSE Mathematics and Mathematics-Numeracy Higher papers, organised for

REVISE
.wales

1.10 — Percentage change, multipliers & reverse %

Spec 1.8.1, 1.8.2 — Unit 1 (calculator allowed)

Percentage change, multipliers and reverse percentage. Sourced from legacy WJEC GCSE Mathematics and Mathematics-Numeracy Higher papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~51 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (34 marks across 10 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 & reverse % — what the new spec asks

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

Multipliers 1.8.1

- Increase by X%: multiply by $1 + X/100$.
- Decrease by X%: multiply by $1 - X/100$.
- +5% → 1.05; −24% → 0.76; +7.5% → 1.075.

Percentage change 1.8.2

- $\frac{\text{new} - \text{old}}{\text{old}} \times 100$ — always over the old.
- Positive: % increase; negative: % decrease.
- Express to a sensible number of significant figures.

Reverse percentage 1.8.2

- Identify the multiplier (e.g. 0.85 for 15% off).
- Original = final ÷ multiplier.
- Sale price £6 154 after 15% off ⇒ original = $6154 \div 0.85$.

Repeated / compounded change 1.8.1

- Same change applied n times: multiplier ^{n}.
- +4% seven times = $\times 1.04^7$.
- Different rates each year: chain the multipliers ($m_1 \times m_2 \times \ldots$).

Crib sheet »

Percentage change, multipliers & reverse % in one page

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

Increase by X%

$$\text{multiplier} = 1 + \frac{X}{100}$$

+20%: $\times 1.20$.

+4%: $\times 1.04$.

Decrease by X%

$$\text{multiplier} = 1 - \frac{X}{100}$$

−20%: $\times 0.80$.

−17%: $\times 0.83$.

% change

$$\frac{\text{new} - \text{old}}{\text{old}} \times 100$$

From 42.5 to 45.9: $\frac{3.4}{42.5} \times 100 = 8\%$ increase.

Reverse percentage

Sale price £72 after 20% off ⇒ original = $72 \div 0.80 = £90$.

Decreased by 17% to 3569 ⇒ original = $3569 \div 0.83$.

Repeated change

+4% repeated 7 times: $\times 1.04^7$.

−12% repeated 3 times: $\times 0.88^3$.

Common traps

- +X% then −X% ≠ original.
- Dividing by $X/100$ instead of the multiplier.
- Mixing up which value is the "old".

Examiner only

5. Marta buys a new television.

(a) Marta wants to fit the television in a bookcase on the wall.
In the shop she forgot to write down the length of the television.
She did write down the height and the diagonal of the screen.

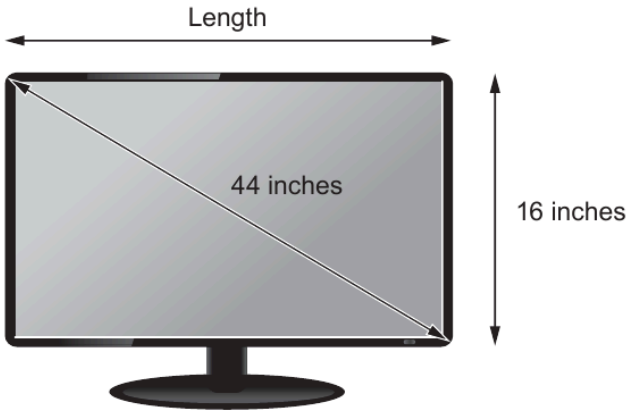


Diagram not drawn to scale

Marta needs to know the length of the screen before she opens the box, in case she wants to return the television.
Calculate the length of the screen.
Give your answer correct to 2 significant figures. [4]

Length is ..... inches, correct to 2 significant figures.

Examiner only

(b) The television was reduced in the sale by 26% of its original price.
It cost Marta £710.40 in the sale.
What was the original price of the television? [2]

Original price £ .....

(c) A television uses 1 unit of electricity every 10 hours.
A unit of electricity costs 9.8 p.

(i) Calculate the cost of having a television turned on for 24 hours.
Circle your answer. [1]

£23.52 £2.35 40.83 p 23.52 p 2.45 p

(ii) On average, Marta watches 4 hours of television each day.
On average, how much **a week** does it cost her to watch television?
Circle your answer. [1]

27.44 p £27.44 £39.20 39.2 p 10.78 p

Examiner only

1. *(a)* Circle the **best** approximate value for the following calculation. [1]

$$\frac{596{\cdot}3}{38{\cdot}2 + 11{\cdot}5}$$

110 12 11 120 10

(b) A number is increased by 4% of its value.
This is done 7 times, each time increasing the previous value by 4%.
Circle the multiplier that you would use to find the value after the 7 increases. [1]

$\times 1{\cdot}04^7$ $\times 1{\cdot}4^7$ $\times 0{\cdot}04^7$ $\times 1{\cdot}04^6$ $\times 1{\cdot}28$

(c) Calculate $\frac{4}{5} \div \frac{1}{4}$.

Circle the correct answer. [1]

$1\frac{3}{5}$ $\frac{1}{5}$ $\frac{5}{16}$ 5 $3\frac{1}{5}$

Examiner only

4. *(a)* Kingsley invests £3000 in an account that pays 2% compound interest per annum. He does not make any further payments into his account. He does not withdraw any money from his account.

How much will Kingsley have in his account after **two years**? [3]

Amount in Kingsley's account after two years is £ .....

Examiner only

(b) Kingsley buys a portable *Bluetooth* speaker.
The speaker has been reduced by 20% in a sale.
He pays £72 for the speaker in the sale.
What was the original price of the speaker? [2]

.....

.....

.....

.....

.....

.....

.....

.....

Original price of the speaker is £ .....

Examiner only

1. *(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]

.....

.....

.....

.....

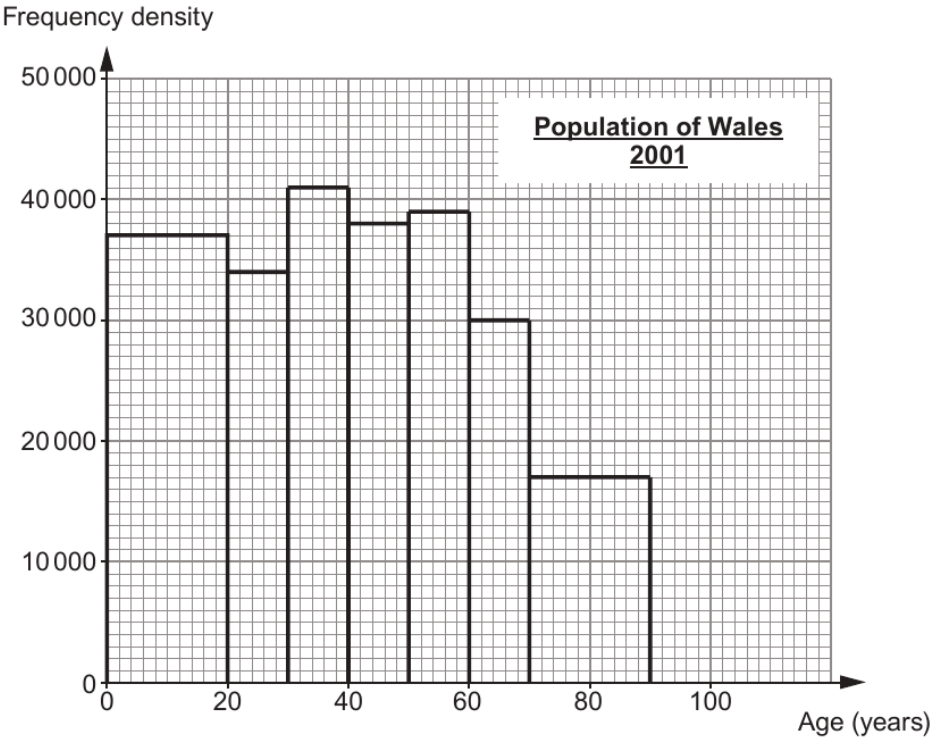
.....

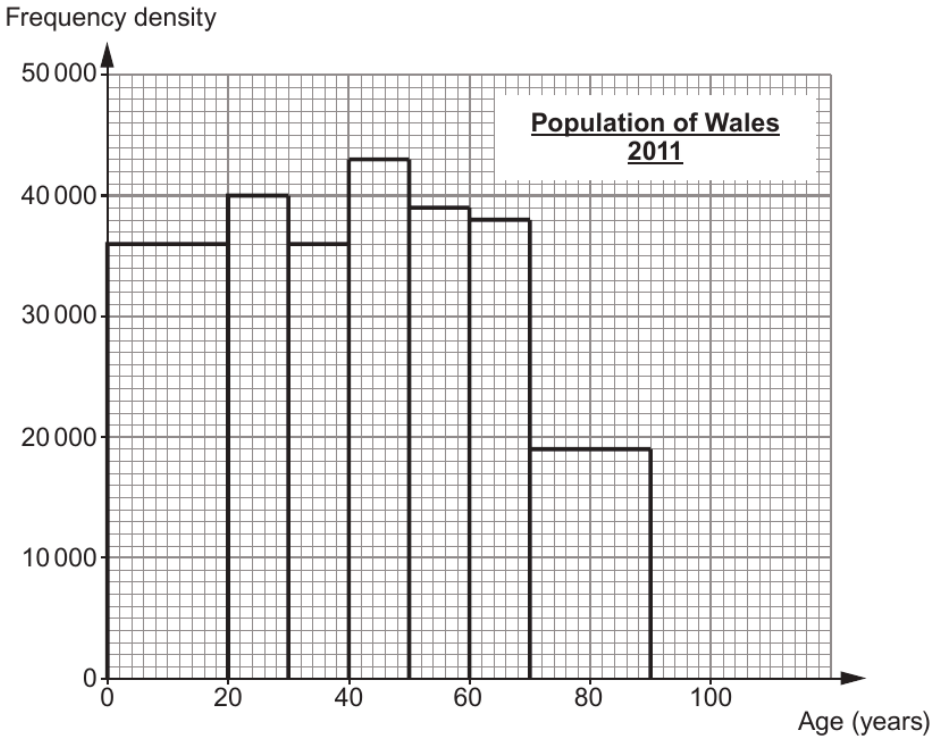
2. Display the following information in a Venn diagram. [3]

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

Examiner only

7. Danielle is studying the growth of the population of Wales.
She used the 2001 and 2011 Census data to draw these histograms.





Examiner only

(a) Use Danielle's histograms to answer the following questions:

(i) Circle the earliest decade in which anyone included in the histograms could have been born. [1]

1890–1899 1900–1909 1910–1919 1920–1929 1930–1939

(ii) From Danielle's histogram, the population of under-50s in Wales was 1 870 000 in 2001.
Calculate the **increase** in the population of under-50s in Wales from 2001 to 2011. [3]

(iii) The 60 to 69-year-olds saw the biggest increase in population from 2001 to 2011.
Calculate the **percentage** increase in the number of 60 to 69-year-olds from 2001 to 2011.
Give your answer to the nearest whole number. [3]

Examiner only

(b)

Age group	Population in 2001	Population in 2011
90 and over	19300	25200

The data in this table was also available to Danielle.
Explain why Danielle did not include this data in her histograms. [1]

.....

.....

.....

.....

.....

(c) The number of 40 to 49-year-olds in 2011 was different to the number of 30 to 39-year-olds in 2001.
Give a full explanation for what could have caused this. [1]

.....

.....

.....

.....

.....

Examiner only

7. *(a)* A number, when increased by 4%, is equal to N.
Which of the following calculations would give you the original number?
Circle your answer. [1]

$N \times 1{\cdot}04$ $N \div 1{\cdot}04$ $N \times 1{\cdot}4$ $N \div 1{\cdot}4$ $N - 4$

(b) The number shown on each diagram below is 20% greater than the number shown on the previous diagram.

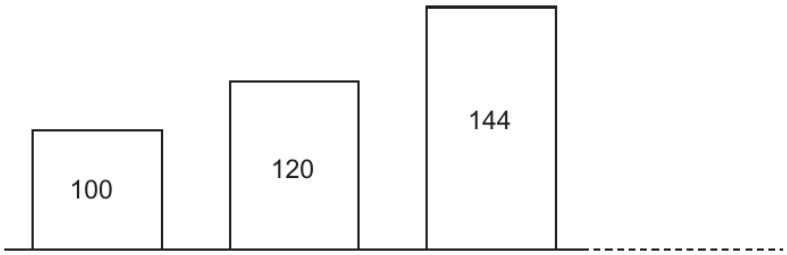


Diagram 1 Diagram 2 Diagram 3

Diagram not drawn to scale

Find the number that should be shown on Diagram 6. [2]

Examiner only

6. 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]

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

Examiner only

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

7. (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

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

Examiner only

7. Shipping containers are used to transport goods around the world.
The dimensions of a shipping container are as follows:

- The height is 2·59 m, correct to the nearest centimetre.
- The width is 2·43 m, correct to the nearest centimetre.
- The length is approximately double the width.

(a) What is the least possible **width** of this shipping container?
Circle your answer. [1]

2·425 m 2·42 m 2·435 m 2·426 m 2·424 m

(b) An end view of a stack of these shipping containers is shown below.

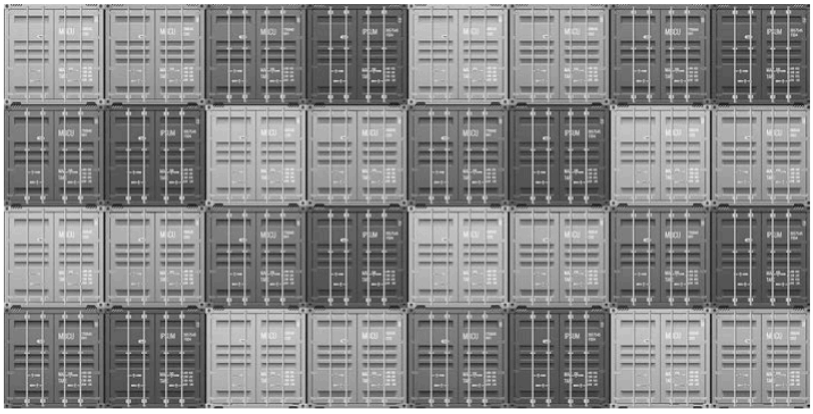


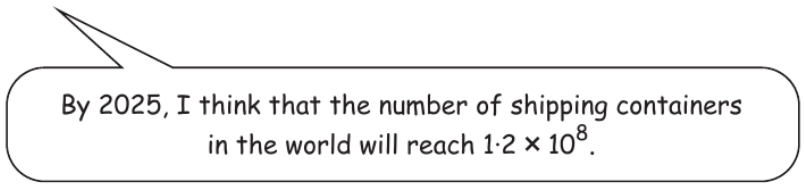
Diagram not drawn to scale

Calculate the greatest possible **height** of the stack of shipping containers.
Give your answer in metres. [3]

Examiner only

(c) In 2012, there were 2×10^7 shipping containers in the world.

Joshua says,



Assuming Joshua is correct, complete the statement below.

"By 2025, the percentage increase in the number of shipping containers in the world since 2012 will be ..... %."

You must show all your working. [3]