

Name	Date started	Target end date

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

Prime factorisation, product of prime factors in index form, lowest common multiple (LCM) and highest common factor (HCF).
Sourced from legacy WJEC GC

REVISE
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2.02 – Primes, factors, LCM & HCF

Spec 1.2.1, 1.2.2, 1.2.3 – Unit 2 (no calculator)

Prime factorisation, product of prime factors in index form, lowest common multiple (LCM) and highest common factor (HCF). Sourced from legacy WJEC GCSE Mathematics Higher non-calculator papers, organised for revision under the 2025 spec.

2025 SPECIFICATION

Estimated time for entire question pack: ~1 hours 56 minutes

Derived from the GCSE Higher pace of ~1.5 min/mark (77 marks across 17 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 **not** permitted on any question in this pack (Unit 2 is the non-calculator paper).*

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Primes, factors, LCM & HCF – what the new spec asks

WJEC GCSE Mathematics (first teaching 2025) · Unit 2: non-calculator.

Prime factorisation 1.2.1

- Every whole number > 1 is a unique product of primes.
- Use a factor tree or repeated division.
- State the answer in index form: $700 = 2^2 \times 5^2 \times 7$.

HCF 1.2.2

- Highest Common Factor = largest integer dividing both.
- Prime method: product of the lowest powers of common primes.
- Useful for simplifying ratios and fractions.

LCM 1.2.3

- Lowest Common Multiple = smallest integer divisible by both.
- Prime method: product of the highest powers of every prime that appears.
- Used for adding fractions and for repeated-event timing.

Sense-check 1.2

- $\text{HCF} \times \text{LCM} = \text{product of the two numbers}$.
- $\text{HCF} \leq \text{either number}$; $\text{LCM} \geq \text{both}$.
- 1 is a factor of every number; 0 is a multiple of every number.

Primes, factors, LCM & HCF in one page

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

Prime factor tree

Split a number into prime factors by repeated division.

$$315 = 3 \times 105 = 3 \times 3 \times 35 = 3^2 \times 5 \times 7.$$

Each leaf of the tree is a prime.

Index form

Group repeated primes as powers.

$$700 = 2^2 \times 5^2 \times 7.$$

$$72 = 2^3 \times 3^2.$$

LCM – highest powers

LCM = product of *highest* powers of all primes seen

$$12 = 2^2 \times 3, 18 = 2 \times 3^2.$$

$$\text{LCM} = 2^2 \times 3^2 = 36.$$

HCF – lowest powers

HCF = product of *lowest* powers of *common* primes

$$12 = 2^2 \times 3, 18 = 2 \times 3^2.$$

$$\text{HCF} = 2 \times 3 = 6.$$

Factor list cross-check

List factors: $12 = 1, 2, 3, 4, 6, 12$.

Common factors of 12 and 18: $1, 2, 3, 6 \Rightarrow$

HCF = 6. Matches the prime method.

Common traps

- Mixing up LCM (largest powers) with HCF (lowest powers).
- Forgetting a prime appears in only one number (skip it in HCF).
- 1 is *not* a prime number.

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(c) Draw the line $y = -3$ on the graph paper.

Write down the values of x where the line $y = -3$ cuts the curve $y = x^2 - 5x + 2$.
Give your answers correct to 1 decimal place.

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Values of x are and

3. (a) Express 700 as a product of its prime factors in index form.

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(b) The number 33 554 432 is equal to 2^{25} .

Explain how this tells you that 33 554 432 is not a square number.

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(b) The square is to be covered in concrete.

Calculate the area of the square.
Expand any brackets, and simplify your answer.

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END OF PAPER



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4. (a) The highest common factor (HCF) of 30 and 75 is the square root of a number.
What is the number? [2]

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(b) The cube root of 32·768 is $33\frac{1}{3}\%$ of a number.
What is the number? [2]

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12. An architect has been asked to design a square-based glass pyramid that is to be built in a park. The vertex at the top of the pyramid will be directly above the centre of the square base. The edges of the pyramid will be made from steel. Each sloping face will be made from glass.

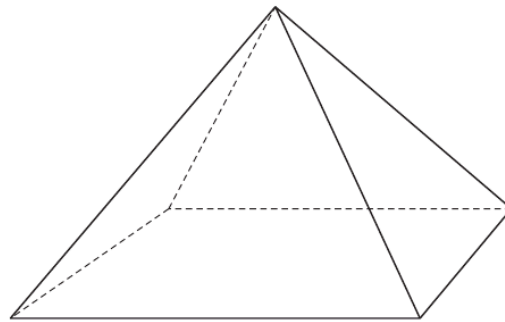


Diagram not drawn to scale

- (a) The architect first plans to make a scale model of the pyramid. The scale model will have base sides of length 14 cm and a vertical height of 8 cm.

The architect has drawn the following diagram of the model.

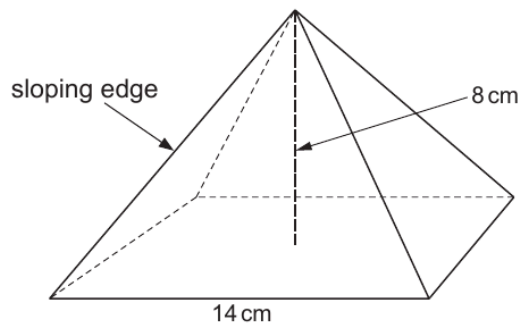


Diagram not drawn to scale

Calculate the length of each sloping edge of the model.

Give your answer in the form $a\sqrt{b}$, where a is an integer and b is a prime number. [6]

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- (b) The area of each glass face on the scale model is 74 cm^2 .
The full-size pyramid is to have a vertical height of 1.6 metres.

Use these values to calculate the area of each glass face on the full-size pyramid.
Give your answer in cm^2 .

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1. (a) Express 315 as a product of its prime factors in index form.

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(b) What is the Highest Common Factor (HCF) of 315 and 42?

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2. (a) Find the Lowest Common Multiple (LCM) of 60 and 72. [2]

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LCM of 60 and 72 is

(b) Express 882 as a product of its prime factors.
Give your answer in index form. [3]

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3. Express 1575 as a product of its prime factors in index form. [3]

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4. Simplify the following expressions.
(a) $2p^3q \times 3p^4q^7$ [2]

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(b) $7a(a+5) - 2(3a^2 + 6a - 7)$ [4]

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2. (a) Express 675 as a product of its prime factors in index form. [3]

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(b) 360 expressed as a product of its prime factors in index form is $2^3 \times 3^2 \times 5$.
What is the smallest whole number that 360 can be multiplied by to give a square number? [1]

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Smallest whole number is



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4. (a) Evaluate $\frac{\sqrt[3]{154}}{7 \cdot 9 - 3 \cdot 26}$.

Give your answer correct to 2 significant figures.

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(b) Calculate the reciprocal of 23.
Give your answer correct to 3 decimal places.

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(c) Circle the correct answer for each of the following.

(i) The Lowest Common Multiple (LCM) of 4 and 6 is:

2 4 6 12 24

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(ii) The Highest Common Factor (HCF) of 10 and 15 is:

5 10 15 30 150

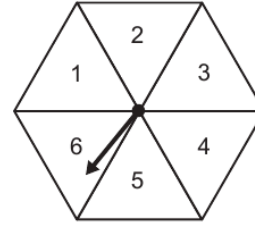
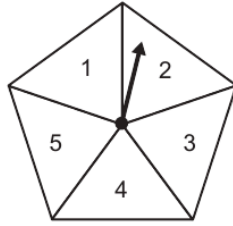
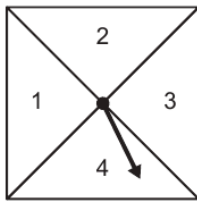
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13. Catherine has three spinners, as shown below.



She spins each spinner once.

(a) Calculate the probability that all three spinners land on prime numbers. [2]

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(b) The numbers that the three spinners land on are added together. Calculate the probability that the total is **greater than 4**. [3]

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4. (a) Express 495 as a product of its prime factors in index form. [3]

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(b) Explain how your answer to part (a) tells you that 495 is **not** a square number. [1]

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(c) Find the Highest Common Factor (HCF) of 495 and 60. [2]

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10. Square-Off is a company that has designed new offices for its workers.

- (a) The main building has a square floor with an area of 500m^2 .
 The reception has a square floor with an area of 80m^2 .
 The triangular region outside the buildings is paved.
 A plan view of the buildings and the paved region is shown below.

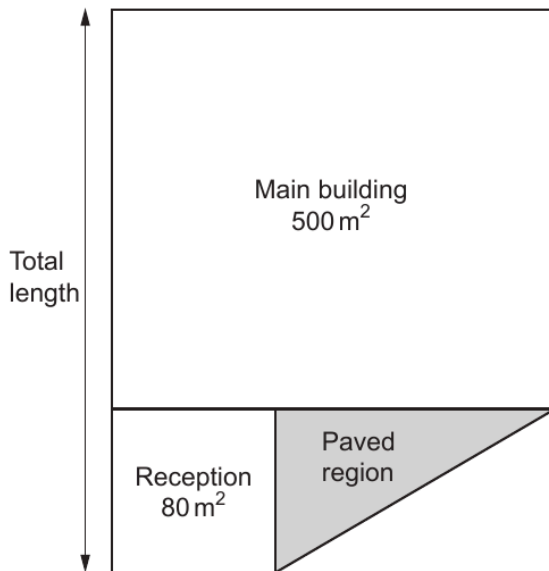


Diagram not drawn to scale

- (i) Calculate the total length of the two buildings.
 Give your answer in the form $a\sqrt{b}$, where a and b are integers and b is a prime number. [3]

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- (ii) Calculate the area of the paved region.
 You must show all your working. [2]

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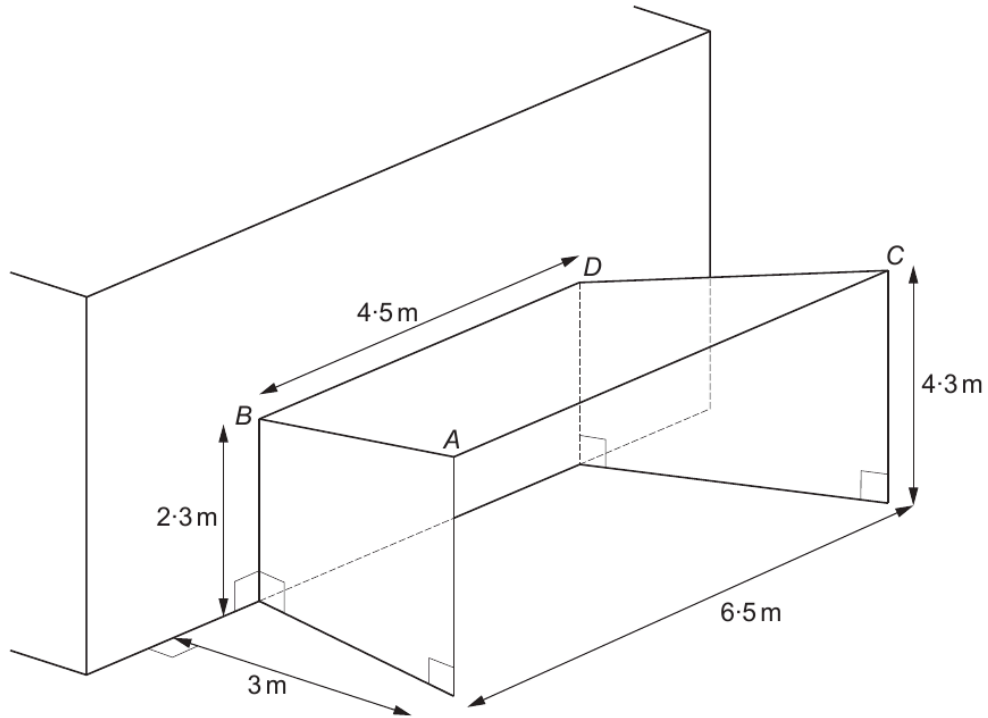
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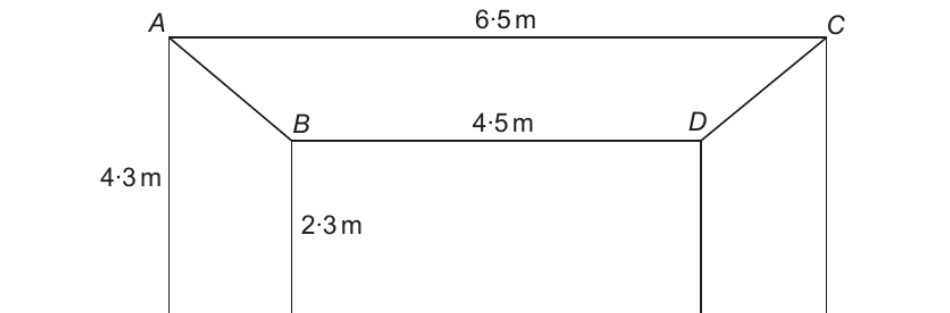


(b) Square-Off has designed an entrance to the reception.

The symmetrical structure is made from 3 connected metal sheets, each in the shape of a trapezium.



FRONT VIEW



Diagrams not drawn to scale



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The 3 metal sheets are connected to each other along the edges AB and CD .
Adhesive strips are needed along the entire length of these edges.

Calculate the length of the adhesive strip AB .
Leave your answer as a surd.

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