

Name	Date started	Target end date

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

Working with positive integer powers (indices): evaluating expressions like  $2^3$  or  $5^2$ , and applying the laws of indices to combine powers of

# REVISE

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## F2.03 – Indices – positive integral powers

### *Spec 1.3.1 – Unit 2 (no calculator)*

*Working with positive integer powers (indices): evaluating expressions like  $2^3$  or  $5^2$ , and applying the laws of indices to combine powers of the same base. 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: ~20 minutes

*Derived from the GCSE Higher pace of ~1.5 min/mark (13 marks across 8 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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# Indices – positive integral powers – what the new spec asks

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

## Powers of integers 1.1.8

- Evaluate  $a^n$  for small positive integer  $n$ .
- Recognise squares and cubes of small integers.
- Write repeated multiplication using index notation.

## Laws of indices 1.1.8

- Apply  $a^m \times a^n = a^{m+n}$ .
- Apply  $a^m \div a^n = a^{m-n}$ .
- Apply  $(a^m)^n = a^{mn}$ .

## Zero & unit powers 1.1.8

- State  $a^0 = 1$  for non-zero  $a$ .
- State  $a^1 = a$ .
- Recognise that  $1^n = 1$  for any  $n$ .

## Exam strategy 1.1

- Non-calculator – expand the power if unsure.
- Check the base matches before combining indices.
- Lay working out clearly: index laws or full expansion.

# Indices – positive integral powers in one page

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

## What a power means

$a^n$  means  $a$  multiplied by itself  $n$  times.

$$2^3 = 2 \times 2 \times 2 = 8. \quad 5^2 = 25.$$

## Multiplying powers

$$a^m \times a^n = a^{m+n}$$

Same base – add the powers.

$$2^3 \times 2^4 = 2^7.$$

## Dividing powers

$$a^m \div a^n = a^{m-n}$$

Same base – subtract the powers.

$$5^6 \div 5^2 = 5^4.$$

## Power of a power

$$(a^m)^n = a^{mn}$$

Multiply the powers.

$$(3^2)^4 = 3^8.$$

## Power of zero

$$a^0 = 1 \text{ (for any non-zero } a)$$

Anything to the power 0 is 1.  $7^0 = 1$ .

## Common traps

- $2^3$  means  $2 \times 2 \times 2 = 8$ , *not*  $2 \times 3 = 6$ .
- Adding powers when bases differ – only works when bases match.
- Forgetting  $a^0 = 1$ , not 0.



Examiner only

4. (a) Write down the next two numbers in the following sequence. [2]

-19      -15      -11      -7      .....      .....

.....

.....

(b) Rods are used to make a sequence of patterns as shown below.



Pattern 1



Pattern 2



Pattern 3

Pattern 1 uses six rods.

(i) How many rods are required to draw Pattern 4? [1]

.....

(ii) Pattern 37 requires 186 rods.  
How many rods are required to draw Pattern 38? [1]

.....

(c) Describe in words the rule used in the following sequence. [1]

243      81      27      9      .....

.....

.....



Examiner  
only

4. A cuboid measures 5 cm by 3 cm by 2 cm.

(a) Calculate the volume of the cuboid.  
Give your answer in  $\text{cm}^3$ .

[2]

.....  
.....  
.....

Volume = .....  $\text{cm}^3$

(b) Calculate the total surface area of the cuboid.  
Give your answer in  $\text{cm}^2$ .

[3]

.....  
.....  
.....  
.....  
.....  
.....

Total surface area = .....  $\text{cm}^2$

5. A number  $n$  is added to the square root of 81.  
The answer is equal to 7 squared.

What is the value of  $n$ ?

[3]

.....  
.....  
.....  
.....  
.....

$n =$  .....

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Examiner  
only

6. (a) Write the next term in the sequence below. [1]

2, 26, 50, 74, .....

(b) Describe the rule for continuing the following sequence. [1]

77, 64, 51, 38, 25, ...

Rule:

.....  
.....

(c) A dog is  $x$  years old.  
Another dog is 2 years younger.  
Write down, in terms of  $x$ , the age of the younger dog. [1]

.....  
.....

7. Gwenan writes down four numbers:

64                  89                  83                  26

(a) Calculate the mean of Gwenan's numbers. [3]

.....  
.....  
.....  
.....

(b) Every number in Gwenan's list is increased by 1.  
What is the mean of her new list of numbers? [1]

.....  
.....

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Examiner  
only

13. A cuboid measures 5 cm by 3 cm by 2 cm.

Calculate the volume of the cuboid.  
Give your answer in  $\text{cm}^3$ .

[2]

.....  
.....  
.....

Volume = .....  $\text{cm}^3$

14. A number  $n$  is added to the square root of 81.  
The answer is equal to 7 squared.

What is the value of  $n$ ?

[3]

.....  
.....  
.....  
.....  
.....

$n =$  .....





Examiner  
only

4. (a) Billy thinks of a number.  
Billy halves his number.  
His answer is 58.

What number did Billy think of?

[1]

- (b) Siân thinks of a different number.  
Siân squares her number.  
Her answer is 9.

What number did Siân think of?

[1]

- (c) Calculate 40% of 120.

[2]

5. (a) Which of the following is equal to 0.5 kg?  
Circle the correct answer.

[1]

50 mg

500 g

500 mg

5 mg

50 g

- (b) Which of the following is equal to 700 cm?  
Circle the correct answer.

[1]

7 m

7 km

0.7 m

0.07 km

70 m

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Examiner  
only

3. Dafydd plays football for his local team.

- (a) Dafydd is working on his fitness.  
Dafydd uses this formula to calculate his Body Mass Index (BMI):

$$\text{BMI} = \text{mass} \div \text{height}^2$$

where mass is in kilograms and height is in metres

Football players should have a BMI between 18 and 24.9.

Dafydd's mass is 79 kg and his height is 1.8 m.

Calculate Dafydd's BMI. [2]

.....

.....

.....

.....

- (b) Dafydd's first game of football was on Saturday.  
The match started at 3 p.m.
  - The playing time of the match was  $1\frac{1}{2}$  hours.
  - Half time was 15 minutes long.
  - After the game, the players completed cool-down exercises and stretching for 20 minutes.
  - Dafydd took 25 minutes to shower and change.
  - The journey home took 45 minutes.

At what time did Dafydd arrive home?  
You must show all your working. [3]

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.....

.....

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Examiner  
only

- (c) The list below shows the number of goals that Dafydd's football team scored in each of their last 7 games.

3      1      6      3      1      1      2

The football coach looks at this data.

- (i) The coach says,

“The median number of goals scored per game is three.”

Show that the coach is not correct.

[2]

.....

.....

.....

- (ii) What is the mode of the number of goals scored per game for the team?

[1]

.....

.....

- (iii) Calculate the range of the number of goals scored per game.

[1]

.....

.....

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