Name	Date started	Target end date

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

Expanding single and double brackets, factorising by taking out a common factor, factorising quadratics, and using the difference of two squares. Sour

REVISE
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2.08 — Expanding brackets & factorising

Spec 2.1.11, 2.1.12, 2.1.13, 2.1.14, 2.1.15 — Unit 2 (no calculator)

Expanding single and double brackets, factorising by taking out a common factor, factorising quadratics, and using the difference of two squares. 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: ~3 hours 16 minutes

*Derived from the GCSE Higher pace of **~1.5 min/mark** (131 marks across 36 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).*

Expanding brackets & factorising — what the new spec asks

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

Expanding single brackets 2.1.11

- $a(b+c) = ab + ac$ for any letters or numbers.
- Distribute negatives carefully: $-3(x-2) = -3x + 6$.
- Then collect like terms across the whole expression.

Expanding double brackets 2.1.12

- Use FOIL or a 2×2 grid.
- $(x+a)(x+b) = x^2 + (a+b)x + ab$.
- Square brackets give $(x+a)^2 = x^2 + 2ax + a^2$.

Factorise by common factor 2.1.13

- Take out the largest factor common to every term.
- Includes numerical and letter factors.
- Re-expand to check no factor was missed.

Factorise quadratics 2.1.14

- $x^2 + bx + c$: pair sums to b, product c.
- $ax^2 + bx + c$: split middle by ac method.
- Always remove a common factor first if there is one.

Difference of two squares 2.1.15

- $a^2 - b^2 \equiv (a+b)(a-b)$.
- Recognise hidden squares: $9x^2 = (3x)^2$.
- Useful for simplification and mental arithmetic.

Crib sheet »

Expanding brackets & factorising in one page

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

Single bracket

$$a(b+c) = ab + ac$$

Multiply the term outside by each term inside.

$3(2x+5) = 6x+15$, $-2(x-4) = -2x+8$.

Double brackets — FOIL

$$(x+a)(x+b) = x^2 + (a+b)x + ab$$

F-O-I-L: First, Outside, Inside, Last.

$(x+3)(x+5) = x^2+8x+15$.

$(x-2)(x+7) = x^2+5x-14$.

Squaring a bracket

$(x+a)^2 = x^2+2ax+a^2$ — don't drop the middle term.

$(x-a)^2 = x^2-2ax+a^2$.

$(2x+3)^2 = 4x^2+12x+9$.

Difference of two squares

$$a^2 - b^2 = (a+b)(a-b)$$

$x^2-25 = (x+5)(x-5)$.

$9x^2-16y^2 = (3x+4y)(3x-4y)$.

Spot it whenever a subtraction sits between two squares.

Factorise — common factor

Take out the highest common factor (number *and* letters).

$6x+9 = 3(2x+3)$.

$8x^2-12x = 4x(2x-3)$.

Always check by re-expanding.

Factorising a quadratic x^2+bx+c

Find two numbers that multiply to c and add to b.

$x^2+7x+12 = (x+3)(x+4)$ — $3\times4 = 12$, $3+4=7$.

$x^2-5x+6 = (x-2)(x-3)$ — both factors negative.

Factorising ax^2+bx+c

When $a \neq 1$, split the middle term: find two numbers that multiply to ac and add to b.

$2x^2+7x+3$: $ac=6$; 1 and 6 work. Rewrite as $2x^2+x+6x+3 = x(2x+1)+3(2x+1) = (2x+1)(x+3)$.

Common traps

- Sign errors with $-(x-5) = -x+5$.
- Forgetting the middle term: $(x+3)^2 \neq x^2+9$.
- Missing a common factor before factorising further: $2x^2-8 = 2(x^2-4) = 2(x-2)(x+2)$.

Examiner only

4. *(a)* Make m the subject of the formula $y = 6m + 7$. [2]

(b) Factorise $6x^2 - 12x$. [2]

5. Find, in standard form, the value of each of the following.

(a) $\dfrac{7{\cdot}5 \times 10^6}{5000}$ [2]

(b) $(2{\cdot}3 \times 10^3) + (6{\cdot}4 \times 10^4)$ [2]

Examiner only

9. *(a)* Factorise $x^2 - 2x - 24$, and hence solve $x^2 - 2x - 24 = 0$. [3]

(b) Solve the equation $\frac{4x-3}{2} + \frac{7x+1}{6} = \frac{29}{2}$. [4]

Examiner only

12. *(a)* Factorise $(x - 7)^2 + 2(x - 7)$. [2]

(b) Factorise $12x^2 - 27y^2$. [3]

Examiner only

(c) If a large number of people played the game, approximately what fraction of them would you expect to choose a white ball?
Circle your answer. [1]

$\frac{1}{10}$ $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$

.....

.....

8. (a) Factorise $x^3 - 5x$. [1]

.....

(b) Expand and simplify $(2x - 3)(x + 4)$. [2]

.....

.....

.....

(c) Factorise $x^2 - 3x - 28$. [2]

.....

.....

.....

Examiner only

8. Factorise $x^2 - 7x - 18$, and hence solve $x^2 - 7x - 18 = 0$. [3]

Examiner only

11. A company is building a new headquarters.
The diagram below shows the ground plan of the new headquarters.

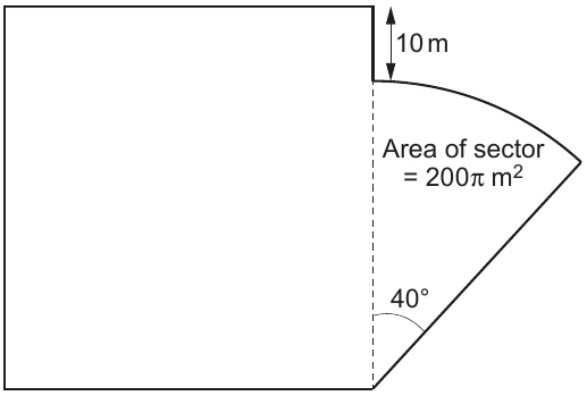


Diagram not drawn to scale

The plan consists of a square and a sector of a circle.

(a) Using the information given in the diagram, calculate the radius of the sector of the circle.

Give your answer in the form $a\sqrt{b}$, where a is an integer and b is a prime number. [5]

Examiner only

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

Calculate the area of the square.
Expand any brackets, and simplify your answer. [3]

END OF PAPER

Examiner only

17. Simplify $\dfrac{12x+16}{9x^2-16}$. [4]

Examiner only

3. *(a)* Expand and simplify the following expression. [4]

$$x(5x - 2) - 3(x^2 - 2x + 7)$$

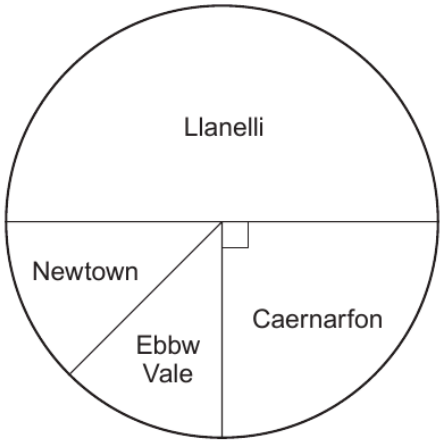
(b) Solve $\frac{22 - f}{3} = 6$. [3]

4. *(a)* A fair, six-sided dice is thrown twice.
What is the probability that a 3 is thrown on both occasions? [2]

Examiner only

(b) A company has offices in Llanelli, Caernarfon, Newtown and Ebbw Vale.
Its national committee is made up of workers from these four offices.

The pie chart below shows what fraction of the committee members come from each office.



There is an equal number of members from Newtown and Ebbw Vale.

A member is chosen at random from this committee to be its chairperson.

(i) The probability that the chosen member works at the Llanelli office is shown in the table below.

Complete the table. [2]

Office	Llanelli	Caernarfon	Newtown	Ebbw Vale
Probability	$\frac{1}{2}$			

(ii) What is the probability that the member chosen as chairperson works at either the Llanelli or the Ebbw Vale office?
You must show all your working. [2]

Examiner only

5. *(a)* Calculate the value of $(2 \times 10^{-4}) \times (7{\cdot}8 \times 10^{9})$.
Give your answer in standard form. [2]

(b) Calculate the value of $\dfrac{3{\cdot}9 \times 10^{8}}{3000}$.
Give your answer in standard form. [2]

6. Factorise $12x^2 + 3xy$. [2]

Examiner only

10. Factorise $4m^2 - 289$. [2]

11. Calculate the volume of a pyramid with a base area of 13 200 cm^2 and a perpendicular height of 460 cm.
Give your answer in m^3. [3]

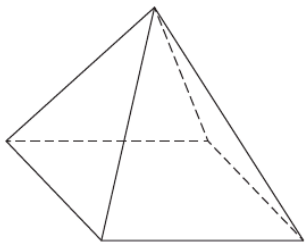


Diagram not drawn to scale

Volume = ... m^3

Examiner only

15. *(a)* Express $0\dot{2}\dot{4}\dot{5}$ as a fraction. [2]

(b) Expand and simplify $(8-3\sqrt{7})(5+\sqrt{7})$. [2]

Examiner only

1. *(a)* Expand $3x(x^2 - 2)$. [2]

(b) Make g the subject of the formula $f = 2 - 3g$. [2]

(c) (i) Solve $7x - 3 < 29$. [2]

(ii) What is the greatest integer value of x that satisfies the above inequality? [1]

Examiner only

13. *(a)* Fully factorise the expression $c^3 - cd^2$. [3]

(b) Factorise and simplify $5(e-1)^2 + 3(e-1)$. [2]

Examiner only

12. *(a)* Factorise $81p^2 - 1$. [2]

(b) Factorise $7t^2 + 19t - 6$. [2]

13. A car travels 300 km, measured correct to the nearest 5 km.
It travels this distance in 6 hours, measured correct to the nearest hour.

Calculate the least possible average speed of the car.
Give your answer in km/h, correct to 2 decimal places. [3]

Examiner only

19. Use the quadratic formula to solve $(3x - 2)^2 = (x + 1)(x + 2)$.
Give your answers correct to 2 decimal places.
You must show all your working. [6]

Examiner only

10. Simplify, and then factorise, the following expression. [3]

$$k(9k - 1) + k - 25n^2$$

Examiner only

6. *(a)* Factorise $x^2 - 7x + 12$, and hence solve $x^2 - 7x + 12 = 0$. [3]

(b) Expand and simplify $(5x - 2)^2$. [2]

Examiner only

13. *(a)* Factorise $4x^2 - 81$. [2]

(b) Factorise $7x^2 + 10x - 8$. [2]

(c) Factorise $(x + 2)^3 + 5(x + 2)^2$. [2]

Examiner only

14. *(a)* Express $0\dot{8}\dot{1}\dot{2}$ as a fraction. [2]

(b) Simplify $\sqrt{72}$.
Circle your answer. [1]

$2\sqrt{6}$ $6\sqrt{2}$ $6\sqrt{12}$ 36 $36\sqrt{2}$

(c) Expand and simplify $\left(7-2\sqrt{5}\right)\left(3+\sqrt{5}\right)$. [2]

Examiner only

6. *(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

8. Factorise $x^2 - 4x - 12$, and hence solve $x^2 - 4x - 12 = 0$. [3]

Examiner only

2. (a) Make m the subject of the formula $w = 8m - 3$. [2]

(b) Expand and simplify $(y + 5)(y - 4)$. [2]

3. The height of a cylinder is 24·8 cm.
The ratio of the **diameter** of the cylinder to the height of the cylinder is 3 : 2.

Find the volume of the cylinder.
Give your answer correct to 2 significant figures.
You must show all your working. [5]

Examiner only

5. (a) Factorise $8x^2 + 6xy$. [2]

(b) (i) Factorise $x^2 + 13x + 40$. [2]

(ii) Explain how you can check that your answer to part (i) is correct. [1]

6. Calculate $5{\cdot}7 \times 10^5 \times 6{\cdot}4 \times 10^{-2}$.
Circle the correct answer. [1]

$3{\cdot}648 \times 10^8$ $3{\cdot}648 \times 10^4$ $-3{\cdot}648 \times 10^6$ $3{\cdot}648 \times 10^3$ $3{\cdot}648 \times 10^6$

Examiner only

18. Simplify $\frac{6x-15}{4x^2-25}$. [4]

END OF PAPER

Examiner only

10. (a) Expand and simplify $(2h+3t)(5h-7t)$. [3]

(b) Simplify $\dfrac{7(d+5)^8}{(d+5)^{-2}}$. [1]

Examiner only

15. Write down an **irrational** number whose value is between 9 and 10.
Write your answer in the box below. [1]

Irrational number is: ☐

16. Fully factorise the expression $k^3p - kp^3$. [3]

Examiner only

1. (a) Solve the equation $7+5(x-2)=3x+8$. [3]

(b) Make f the subject of the formula $h=13-2f$. [2]

(c) Factorise $15x-35y$. [1]

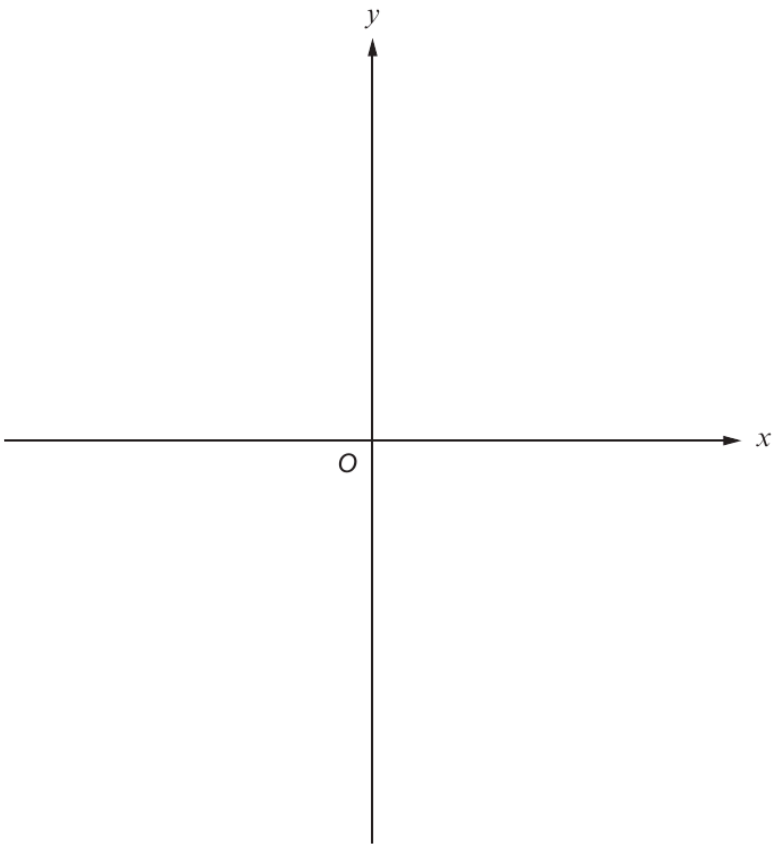
Examiner only

12. (a) Factorise $8x^2 - 18$. [3]

(b) Hence solve $8x^2 - 18 = 0$. [1]

Examiner only

(c) Hence, sketch the graph of $y = 8x^2 - 18$ on the axes below.
Mark clearly the coordinates of any point where this graph crosses an axis. [2]



Space for working:

Examiner only

17. (a) Expand and simplify $\left(4-\sqrt{6}\right)\left(1+\sqrt{6}\right)$. [2]

(b) (i) Write down an **integer** value of x that is greater than 5, for which $x^{\frac{3}{2}}$ is rational. [1]

$x =$ .....

(ii) Write down an **integer** value of x that is greater than 5, for which $x^{\frac{2}{3}}$ is rational. [1]

$x =$ .....

(iii) Write down an **integer** value of x that is greater than 5, for which $x^{\frac{3}{2}}$ **and** $x^{\frac{2}{3}}$ are both rational. [1]

$x =$ .....

END OF PAPER

Examiner only

9. Factorise $x^2 - 8x - 20$, and hence solve $x^2 - 8x - 20 = 0$. [3]

Examiner only

11. (a) Factorise $6x^2 + 19x + 10$. [2]

(b) Fully factorise the expression $m^3 - 25m$. [3]

(c) Factorise $(p+7)(p+29) + 2(p+7)$. [2]

Examiner only

8. Factorise $x^2 + 3x - 40$, and hence solve $x^2 + 3x - 40 = 0$. [3]

9. a and b are two numbers, where $b > a$.

The mean of the two numbers is equal to the range of the two numbers.

Show that $3a = b$. [3]

Examiner only

14. Factorise $2x^2 - 17x + 30$. [2]

15. (a) Circle the correct answer in each of the following questions:

(i) $\sqrt{20}$ is equal to [1]

$5\sqrt{2}$ $2\sqrt{5}$ 10 $5\sqrt{4}$ $4\sqrt{5}$

(ii) $\sqrt{2} + \sqrt{50}$ is equal to [1]

$\sqrt{52}$ 10 $6\sqrt{2}$ 26 $26\sqrt{2}$

(b) When $q = \sqrt{18}$, which **one** of the following produces a rational number? Circle your answer. [1]

$\sqrt{q}$ $\frac{q}{2}$ $q - 2$ q^4 $18q$

Examiner only

16. (a) Simplify $\dfrac{4y^2+8xy}{y^2-4x^2}$. [4]

(b) Make f the subject of the following formula. [5]

$$\sqrt{hf^2-m}=3f$$

Examiner only

7. A rectangle has length $(x+5)$ cm and width $(x+3)$ cm.
The area of the rectangle is 120 cm^2.

(a) Show that $x^2+8x-105=0$. [2]

(b) Factorise $x^2+8x-105$, and hence solve $x^2+8x-105=0$. [3]

(c) Use your solutions from part (b) to find the dimensions of the rectangle.
You must justify any decisions that you make. [2]

Length of rectangle = ... cm

Width of rectangle = ... cm

Examiner only

14. Factorise $(2x+3)^2-16$. [4]

15. Use the quadratic formula to solve the equation $11x^2 = 23x+19$.
Give your answer correct to 2 decimal places.
You **must** show all your working. [4]