Name	Date started	Target end date

REVISE
.wales

Proof & algebraic manipulation

Algebra · Level 2 Certificate (9550) · calculator allowed

Proving algebraic identities ('show that … ≡ …') by expanding and collecting terms carefully.

LEVEL 2 · 9550

Estimated time for entire question pack: ~29 minutes

*At the Additional Maths pace of **~1.2 min/mark** (24 marks across 6 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. It gathers every question on this topic from the 2011–2024 papers.

Questions are ordered by year, newest first.

INSTRUCTIONS

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

A calculator is allowed throughout this qualification.

Proof & algebraic manipulation — what's examined

WJEC Level 2 Additional Mathematics (9550) · single written paper, calculator allowed.

Identities Algebra

- ≡ means true for all values.
- Work one side until it matches the other.
- Expand brackets and collect like terms.

Showing it fully Method

- Every step must be shown for full marks.
- Don't jump to the answer.
- Finish at the required form.

Algebraic care Algebra

- Mind signs when multiplying out.
- Keep terms organised by power.
- Check a value at the end.

Crib sheet »

Proof & algebraic manipulation in one page

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

Expanding

Multiply every term in the first bracket by every term in the second; then collect like terms.

≡ vs =

≡ (identity) holds for all x; = (equation) holds for particular x only.

Strategy

Start from the messier side and simplify towards the target — don’t work both sides at once.

Sanity check

Substitute a simple value (e.g. x = 1) into both sides to spot slips.

2. n is a whole number.
Show, **by factorising**, that n^3-n is the product of 3 consecutive numbers.
Hence, given that $n^3-n=120$, find the value of n. [4]

$n =$ .....

3. **Do not use a calculator** to answer this question.

(a) Simplify $\left(4\sqrt{3}+1\right)^2-1$.

Give your answer in the form $a\left(b+\sqrt{c}\right)$ where a, b and c are integers.

You must show all your working. [4]

(b) Rationalise the denominator in the following expression.

$$\frac{1}{6-\sqrt{7}}$$

You must show all your working. [2]

5. Given that $a = v + u$, $b = v - u$ and $c = uv$, show that $a^2 - b^2 = 4c$. [4]

6. (a) Find the remainder when $3x^3 + 4x^2 + 3x + 1$ is divided by $x - 2$. [2]

(b) (i) Show that $x + 6$ is a factor of $x^3 + x^2 - 24x + 36$. [2]

(ii) **Hence** factorise $x^3 + x^2 - 24x + 36$. [4]

3. Prove that $\frac{x}{2}-\frac{x+3}{5}+\frac{x+5}{11}\equiv\frac{43x-16}{110}$. [4]

3. Prove that $\frac{3x}{2} - \frac{x-6}{5} + \frac{2x+3}{7} \equiv \frac{111x+114}{70}$. [4]

4. Prove that $\frac{2x}{3} - \frac{x-7}{4} + \frac{3x+1}{5} \equiv \frac{61x+117}{60}$. [4]

4. Prove that $\frac{2x}{7} - \frac{x-3}{2} + \frac{3x+2}{21} \equiv \frac{67-3x}{42}$.

[4]

End of question pack