Name	Date started	Target end date

WJEC Level 2 Additional Mathematics — Question Pack

Factorising ax^2+bx+c and using it to solve quadratic equations — the staple opener on almost every paper.

REVISE
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Factorising & solving quadratics

Algebra · Level 2 Certificate (9550) · calculator allowed

Factorising ax^2+bx+c and using it to solve quadratic equations — the staple opener on almost every paper.

LEVEL 2 · 9550

Estimated time for entire question pack: ~1 hours 2 minutes

*At the Additional Maths pace of **~1.2 min/mark** (52 marks across 9 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.

Factorising & solving quadratics — what's examined

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

Factorising Algebra

- Factorise ax^2+bx+c into two brackets.
- Always take out a common factor first.
- Recognise the difference of two squares.

Solving by factorising Algebra

- Rearrange so one side is 0.
- If a product of brackets is 0, set each bracket to 0.
- State both roots clearly.

Showing working Method

- Show the factorised form before the roots.
- Correct factors score even if a root slips.
- Check by expanding back out.

Crib sheet »

Factorising & solving quadratics in one page

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

Splitting the middle term

Find two numbers that multiply to **a×c** and add to **b**; split the bx term, then factorise in pairs.

Difference of two squares

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

Solving

$$(x - p)(x - q) = 0 \Rightarrow x = p \text{ or } x = q$$

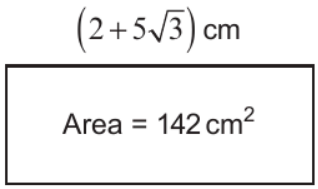
Common slip

A common factor with no x in it does **not** give a root — only brackets containing x do.

4. Use a method of factorising to solve $\frac{x^2+5x}{2}=18$. [4]

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

(a) The area of a rectangle is 142 cm^2.
It has a length of $\left(2+5\sqrt{3}\right)$ cm.



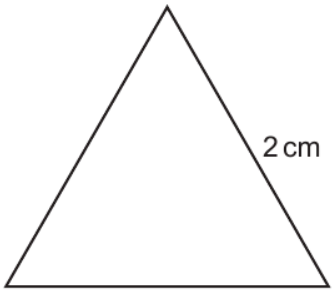
Calculate the width of the rectangle.

Give your answer in the form $a\left(b+c\sqrt{d}\right)$, where $a > 1$, and a, b, c and d are integers.

You must show all your working. [4]

(b) The equilateral triangle below has sides of length 2 cm.

Use this to show that $\cos 30^\circ = \frac{\sqrt{3}}{2}$. [2]



2. Factorise $14x^2 - 5x - 1$ and **hence** solve the equation $14x^2 - 5x - 1 = 0$. [4]

3. **Do not use a calculator** to answer this question.
All working must be shown.

(a) Find the value of $(4^{\frac{1}{4}})^{-12}$.

You must show all your working. [2]

(b) Rationalise the denominator in the following expression.

$$\frac{1}{12-\sqrt{11}}$$

You must show all your working. [2]

1. Factorise $20x^2 + 7x - 3$ and **hence** solve the equation $20x^2 + 7x - 3 = 0$. [4]

2. Find $\frac{dy}{dx}$ for **each** of the following.

(a) $y = 7x^{10} - 5x - 22$ [3]

(b) $y = x^{-12}$ [1]

(c) $y = x^{\frac{3}{8}}$ [1]

(d) $y = \frac{1}{x^4}$ [1]

1. *(a)* (i) Factorise $21x^2 - 8x - 4$. [2]

(ii) **Hence** solve the equation $21x^2 - 8x - 4 = 0$. [2]

(b) (i) Use the method of completing the square to find the least value of

$$x^2 + 12x + 49.$$ [3]

Least value of $x^2 + 12x + 49$ is .....

(ii) What is the value of x when $x^2 + 12x + 49$ has its least value? [1]

2. Find $\frac{dy}{dx}$ for each of the following.

(a) $y = 9x^4 + 4x^2 - 3$ [3]

(b) $y = x^{-8}$ [1]

(c) $y = x^{\frac{3}{4}}$ [1]

1. Factorise $6x^2 - 11x - 10$ and **hence** solve the equation $6x^2 - 11x - 10 = 0$. [4]

2. *(a)* Factorise $15x^2 - 14x - 8$. [4]

Hence solve the equation $15x^2 - 14x - 8 = 0$.

(b) Use the method of completing the square to find the least value of $x^2 + 10x + 3$. [3]

3. *You will be assessed on the quality of your written communication in this question.*

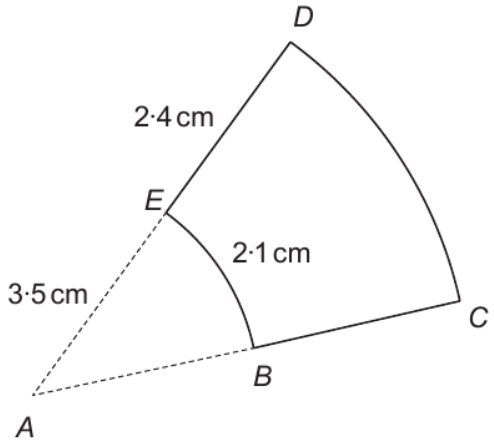


Diagram not drawn to scale

ADC is a sector of a circle, centre *A*.
AEB is a sector of another circle, also with centre *A*.
Calculate the perimeter of the shape *BCDE*.
You must show all your working. [8]

2. *(a)* Factorise $8x^2 - 10x - 3$.

Hence solve the equation $8x^2 - 10x - 3 = 0$.

[4]

(b) Use the method of completing the square to find the least value of $x^2 + 12x + 5$.

[3]

3. Consider two squares of different sizes.
The perimeter of the larger square is 12 cm greater than the perimeter of the smaller square.
The area of the larger square is 30 cm^2 greater than the area of the smaller square.

Calculate the dimensions of each square.
You must use an algebraic method, **not** a trial and improvement method.

[7]

9. *(a)* Factorise $15x^2 - x - 6$.

Hence solve the equation $15x^2 - x - 6 = 0$.

[4]

(b) Use the method of completing the square to find the least value of $x^2 + 10x + 15$.

[3]

10. Solve the simultaneous equations

$$2x + y = 13,$$
$$x^2 + xy - 30 = 0.$$

[6]

1. *(a)* (i) Factorise $6x^2 - 13x - 5$.

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[2]

(ii) **Hence** solve the equation $6x^2 - 13x - 5 = 0$.

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[2]

(b) Use the method of completing the square to find the least value of $x^2 + 6x + 5$.

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[3]