



A-level Mathematics Summer Work

Welcome to Mathematics A-level!



There are two important things that you need to do to be ready to start the A level in September.

1. Buy a suitable **calculator** – see details on page 2
2. Complete the transition **summer work**

It is so important that you start the course feeling prepared so please give yourself plenty of time to complete the transition work. It should take you approximately 5 hours in total.

Transition work

This work will comprise of two parts: The first will be a **question paper you need to complete and mark** which will consolidate and extend skills you will have learnt from GCSE and that will be essential for the A-level. The second will be an opportunity to explore why you want to study maths in the form of a short **summer project**.

Question paper

The transition from GCSE to A level Maths can be challenging but with plenty of practice, it most certainly is a rewarding experience. This resource will focus on key skills that you will have met during your GCSE and which you will need to have right from the start of your A level.

The content will also form part of an assessment done in class after your first two weeks.

Instructions:

Step 1 – Complete the questions to assess strengths and weaknesses (use **QR code 1** to access the questions)

[Questions](#)

Step 2 – Watch the videos to mark and correct your work (use **QR code 2** to access the videos)

[Videos with Answers](#)

Step 3 – Complete the end of chapter question paper (this can be printed out and completed or the answers just written on paper) (use **QR code 2** and scroll down to the bottom to access the question paper)

[Question Paper](#)

Step 4 – Mark the end of chapter question paper using the solutions (use **QR code 2** and scroll down to access the solutions to the question paper)

[Question Paper - Solutions](#)

Step 5 - Bring the **marked answers** with you ready for your first lesson!

A Level Mathematics Summer Project

What do you find Beautiful, Useful or Interesting About Maths?

Welcome to A Level Mathematics!

Before starting the course in September, you are asked to complete a short independent project exploring an area of mathematics that you personally find:

- **Beautiful, interesting, surprising, powerful, or useful in the real world**

The aim is to help you begin thinking like a mathematician: exploring ideas and communicating them clearly.

Your Task

Produce a piece of **digital media** that explains a mathematical idea, topic, pattern or application that you find engaging.

Suggested Formats

You can present your work in any suitable digital format, for example:

Short video documentary, Podcast episode, Animated explanation, PowerPoint or Google Slides presentation, Website or blog post, Digital poster or infographic, Interactive Desmos/GeoGebra demonstration, Screencast teaching a concept, Mini documentary/interview, Mathematical photography project.

Be creative.

Possible Project Ideas

Infinity, Fractals, Fibonacci numbers and the Golden Ratio, Symmetry, Prime numbers, Cryptography, Proofs and paradoxes, Non-Euclidean geometry, Maths in sport, Climate modelling, Space travel, Artificial intelligence, Medical statistics, GPS and navigation, Architecture and engineering, Gaming physics, Probability in gambling, Data science, Spreadsheets and modelling, Bias in statistics, Predicting elections or sport, Maths in art, Tessellations, Music and mathematics, Optical illusions

Project Requirements

Your project should:

Explain the mathematics clearly. Include accurate mathematical content. Show curiosity and independent research. Include examples, diagrams or demonstrations. Be understandable to another Year 12 maths student. Include references for any sources used

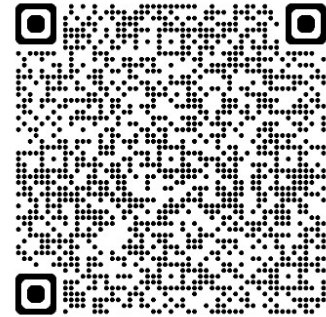
We look forward to seeing what you create!

Ways to access the Question Paper and Solutions (also included at the end of this pdf)

QR Code 1



QR Code 2



Calculators:

You must pick one of the following two calculators. Both are entirely suitable for the course. The CG100 has more functions (including drawing graphs) but is significantly more expensive. Training will be given on both and it is your choice which you would rather purchase.*

Amazon often have the best price when buying new, but you may find that you can pick up a cheaper second version on ebay as well.



[fx-991 CW](#)



[FX-CG100](#)

* If you meet the criteria for the Sixth Form Bursary then a fx-991 will be provided for you free of charge in September.

Write your name here

Surname

Other names

Pearson Edexcel
Level 3 GCE

Centre Number

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Candidate Number

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Mathematics

Year 11 to Year 12 Transition Paper

Algebraic Expressions

You must have:

Mathematical Formulae and Statistical Tables,
calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for algebraic manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer cross it out and put your new answer and any working out underneath.

Turn over ►

Calculators may NOT be used to answer these questions.

1. Expand and simplify $(4x - 3)(3x + 1)$

(Total for Question 1 is 2 marks)

2. (a) Expand and simplify $(2x + 1)(x - 4)$

(2)

- (b) Expand and simplify $(3x - 5y)^2$

(2)

(Total for Question 2 is 4 marks)

3. (a) Expand and simplify $(x - y)(x + 2y)$

(2)

- (b) Factorise $12u^2t^2 + 18ut^3$

(2)

(Total for Question 3 is 4 marks)

4. (a) Simplify

$$\sqrt{50} - \sqrt{18}$$

giving your answer in the form $a\sqrt{2}$, where a is an integer.

(2)

- (b) Hence, or otherwise, simplify

$$\frac{12\sqrt{3}}{\sqrt{50} - \sqrt{18}}$$

giving your answer in the form $b\sqrt{c}$, where b and c are integers and $b \neq 1$.

(3)

(Total for Question 4 is 5 marks)

5. Simplify

$$\frac{7 + \sqrt{5}}{\sqrt{5} - 1},$$

giving your answer in the form $a + b\sqrt{5}$, where a and b are integers.

(Total for Question 5 is 4 marks)

6. Simplify

(a) $(2\sqrt{5})^2$, (1)

(b) $\frac{\sqrt{2}}{2\sqrt{5} - 3\sqrt{2}}$, giving your answer in the form $a + \sqrt{b}$, where a and b are integers. (4)

(Total for Question 6 is 5 marks)

7. (a) Factorise $24w^2y^3 - 8wy^2$ (2)

(b) Factorise $3ef - 3e + 2f - 2$ (2)

(c) Factorise $25 - 4x^2$ (1)

(Total for Question 7 is 5 marks)

8. (a) Simplify $(3\sqrt{7})^2$ (1)

(b) Simplify

$$\frac{\sqrt{3}}{5\sqrt{3} + 6\sqrt{2}}$$

giving your answer in the form $a + b\sqrt{c}$, where a , b and c are integers and $b \neq -1$

(4)

(Total for Question 8 is 5 marks)

9. (a) Find the value of $8^{\frac{5}{3}}$. (2)

(b) Simplify fully $\frac{(2x^{\frac{1}{2}})^3}{4x^2}$. (3)

(Total for Question 9 is 5 marks)

10. (a) Simplify $(9x^4)^{\frac{1}{2}}$ (1)

(b) Simplify $a^7 \div a^{-3}$ (1)

(c) Simplify $(x^{-2})^{-3}$ (1)

$$\frac{(2q)^2 - q^{\frac{7}{2}}}{q^2} \text{ can be written in the form } d - q^f$$

(d) Work out the value of d and the value of f . (3)

(Total for Question 10 is 6 marks)

11. (a) Factorise $63x^2d + 9xd^2$ (2)

(b) Factorise $4ab - 8b + 2a - 4$ (3)

(c) Factorise $x^2 - 9t^2$ (1)

(Total for Question 11 is 6 marks)

12. (a) Simplify

$$\sqrt{32} + \sqrt{18},$$

giving your answer in the form $a\sqrt{2}$, where a is an integer. (2)

(b) Simplify

$$\frac{\sqrt{32} + \sqrt{18}}{3 + \sqrt{2}},$$

giving your answer in the form $b\sqrt{2} + c$, where b and c are integers. (4)

(Total for Question 12 is 6 marks)

13. (a) Simplify $(p^{-2})^{-4}$ (1)

(b) Simplify $(16t^2)^{\frac{3}{2}}$ (2)

(Total for Question 13 is 3 marks)

14. (a) Write down the value of $32^{\frac{1}{5}}$. (1)

(b) Simplify fully $(32x^5)^{-\frac{2}{5}}$. (3)

(Total for Question 14 is 4 marks)

15. (i) Express

$$(5 - \sqrt{8})(1 + \sqrt{2})$$

in the form $a + b\sqrt{2}$, where a and b are integers. (3)

(ii) Express

$$\sqrt{80} + \frac{30}{\sqrt{5}}$$

in the form $c\sqrt{5}$, where c is an integer. (3)

(Total for Question 15 is 6 marks)

16. (a) Evaluate $(32)^{\frac{3}{5}}$, giving your answer as an integer. (2)

(b) Simplify fully $\left(\frac{25x^4}{4}\right)^{-\frac{1}{2}}$. (2)

(Total for Question 16 is 4 marks)

17. Show that $\frac{2}{\sqrt{12} - \sqrt{8}}$ can be written in the form $\sqrt{a} + \sqrt{b}$, where a and b are integers.

(Total for Question 17 is 5 marks)

18. Simplify $\sqrt[3]{(8x)^6}$

(Total for Question 18 is 2 marks)

19. (a) Simplify $\left(\frac{x^5}{x^7}\right)^{-1}$ (1)

(b) Simplify $\left(4y^{\frac{2}{3}}\right)^3$ (2)

$6x^{-2}\left(\frac{1}{2}x^6 - \frac{1}{3}x^2\right)$ can be written in the form $ax^n + b$

(c) Find the value of a , the value of b and the value of n . (2)

(d) Expand and simplify $(3y + 2)^2 - (3y - 2)^2$ (2)

(Total for Question 19 is 7 marks)

20. (i) Simplify

$$\sqrt{48} - \frac{6}{\sqrt{3}}$$

Write your answer in the form $a\sqrt{3}$, where a is an integer to be found. (2)

(ii) Solve the equation

$$3^{6x-3} = 81$$

Write your answer as a rational number. (3)

(Total for Question 20 is 5 marks)

Year 11 to Year 12 Transition Paper

Algebraic Expressions

Mark Scheme

Question	Scheme	Marks
1	for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs	M1
	$12x^2 - 5x - 3$	A1
(2 marks)		

Question	Scheme	Marks
2(a)	For expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs	M1
	$2x^2 - 7x - 4$	A1
		(2)
(b)	for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs	M1
	$9x^2 - 30xy + 25y^2$	A1
		(2)
(4 marks)		

Question	Scheme	Marks
3(a)	for expanding bracket to obtain 4 terms with all 4 correct without considering signs or for 3 terms out of 4 correct with correct signs	M1
	$x^2 + xy - 2y^2$	A1
		(2)
(b)	for correct factorisation (B1 for a partial correct factorisation which shows a product of 3 or 4 factors) $6ut^2(2u + 3t)$	B2
		(2)
(4 marks)		

Question	Scheme	Marks
4(a)	$\sqrt{50} - \sqrt{18} = 5\sqrt{2} - 3\sqrt{2}$	M1
	$= 2\sqrt{2}$	A1
		(2)
(b)	$\frac{12\sqrt{3}}{\sqrt{50} - \sqrt{18}} = \frac{12\sqrt{3}}{"2"\sqrt{2}}$	M1
	$= \frac{12\sqrt{3}}{"2"\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{12\sqrt{6}}{4}$	dM1
	$= 3\sqrt{6}$ or $b = 3, c = 6$	A1
		(3)
(5 marks)		

Question	Scheme	Marks
5	$\frac{7 + \sqrt{5}}{\sqrt{5} - 1} \times \frac{(\sqrt{5} + 1)}{(\sqrt{5} + 1)}$	M1
	$= \frac{\dots}{4}$	A1 cso
	$(7 + \sqrt{5})(\sqrt{5} + 1) = 7\sqrt{5} + 5 + 7 + \sqrt{5}$	M1
	$3 + 2\sqrt{5}$	A1 cso
(4 marks)		

Question	Scheme	Marks
6(a)	20	B1
		(1)
(b)	$\frac{\sqrt{2}}{2\sqrt{5}-3\sqrt{2}} \times \frac{2\sqrt{5}+3\sqrt{2}}{2\sqrt{5}+3\sqrt{2}}$	M1
	$= \frac{\dots}{2}$	A1
	Numerator = $\sqrt{2}(2\sqrt{5} \pm 3\sqrt{2}) = 2\sqrt{10} \pm 6$	M1
	$\frac{\sqrt{2}}{2\sqrt{5}-3\sqrt{2}} = \frac{2\sqrt{10}+6}{2} = 3 + \sqrt{10}$	A1
		(4)
(5 marks)		

Question	Scheme	Marks
7(a)	$8wy^2(3wy - 1)$ (B1 for a partial correct factorisation which shows a product of at least 3 factors, eg $8wy(3wy^2 - y)$, $4y(6w^2y^2 - 2wy)$)	B2cao
		(2)
(b)	for $3e(f - 1)$ and $2(f - 1)$ or $f(3e + 2)$ and $-1(3e + 2)$	M1
	$(3e + 2)(f - 1)$	A1oe
		(2)
(c)	$(5 - 2x)(5 + 2x)$ for $(5 - 2x)(5 + 2x)$ oe, eg $-(2x - 5)(2x + 5)$	B1
		(1)
(5 marks)		

Question	Scheme		Marks
8(a)	$(3\sqrt{7})^2 = 63$	Cao	B1
			(1)
(b)	$\frac{\sqrt{3}}{5\sqrt{3}+6\sqrt{2}} \times \frac{5\sqrt{3}-6\sqrt{2}}{5\sqrt{3}-6\sqrt{2}}$	For rationalising the denominator by a correct method (i.e. multiply numerator and denominator by $5\sqrt{3}-6\sqrt{2}$). This statement is sufficient.	M1
	$= \frac{15-6\sqrt{6}}{\dots} \text{ or } = \frac{\dots}{75-72}$	For $15-6\sqrt{6}$ (or $3 \times 5-6\sqrt{6}$) in the numerator or $75-72$ (or 3 from correct work) in the denominator seen at some point i.e. apply isw	A1
	$= \frac{15-6\sqrt{6}}{\dots} \text{ and } = \frac{\dots}{75-72}$	For $15-6\sqrt{6}$ (or $3 \times 5-6\sqrt{6}$) in the numerator and $75-72$ (or 3 from correct work) in the denominator seen at some point i.e. apply isw	A1
	$5-2\sqrt{6}$	Fully correct expression. Allow $a=5$ $b=-2$, $c=6$ but apply isw e.g. $5-2\sqrt{6}$ followed by $a=5$ $b=2$, $c=6$	A1
			(4)
(5 marks)			

Question	Scheme		Marks
9(a)	$8^{\frac{1}{3}} = 2$ or $8^5 = 32768$		M1
	$\left(8^{\frac{5}{3}} = \right) 32$		A1 cao
			(2)
(b)	$\left(2x^{\frac{1}{2}}\right)^3 = 2^3 x^{\frac{3}{2}}$		M1
	$\frac{8x^{\frac{3}{2}}}{4x^2} = 2x^{-\frac{1}{2}}$ or $\frac{2}{\sqrt{x}}$		dM1A1
			(3)
(5 marks)			

Question	Scheme	Marks
10(a)	$3x^2$	B1cao
		(1)
(b)	a^{10}	B1cao
		(1)
(c)	x^6	B1cao
		(1)
(d)	a correct first step eg $4q^2$ or $\frac{7}{2} - 2$	M1oe
	for $d = 4$	A1
	for $f = \frac{3}{2}$ oe	A1oe
		(3)
(6 marks)		

Question	Scheme	Marks
11(a)	B2 cao (B1 for a partial correct factorisation which shows a product of at least 3 factors) $9xd(7x + d)$	B2
		(2)
(b)	for start to method of factorisation e.g. $4b(a - 2)$ and $2(a - 2)$	M1
	for factorisation as product of 1 factor in terms of a and 1 factor in terms of b e.g. $(4b + 2)(a - 2)$	M1
	$2(a - 2)(2b + 1)$	A1
		(3)
(c)	$(x - 3t)(x + 3t)$	B1
		(1)
(6 marks)		

Question	Scheme	Marks
12(a)	$\sqrt{32} = 4\sqrt{2}$ or $\sqrt{18} = 3\sqrt{2}$	B1
	$(\sqrt{32} + \sqrt{18} =) \underline{7\sqrt{2}}$	B1
		(2)
(b)	$\times \frac{3-\sqrt{2}}{3-\sqrt{2}}$ or $\times \frac{-3+\sqrt{2}}{-3+\sqrt{2}}$ seen	M1
	$\left[\frac{\sqrt{32} + \sqrt{18}}{3 + \sqrt{2}} \times \frac{3 - \sqrt{2}}{3 - \sqrt{2}} = \right] \frac{a\sqrt{2}(3 - \sqrt{2})}{[9 - 2]} \rightarrow \frac{3a\sqrt{2} - 2a}{[9 - 2]}$ (or better)	M1
	$= \underline{3\sqrt{2}, -2}$	A1, A1
		(4)
(6 marks)		

Question	Scheme	Marks
13(a)	p^8	B1cao
		(1)
(b)	$64t^3$ (B1 for $64t^n$, $n \neq 3$ or ct^3 , $c \neq 64$)	B2cao
		(2)
(3 marks)		

Question	Scheme	Marks
14(a)	$32^{\frac{1}{5}} = 2$	B1
		(1)
(b)	For 2^{-2} or $\frac{1}{4}$ or $\left(\frac{1}{2}\right)^2$ or 0.25 as coefficient of x^k , for any value of k including $k = 0$	M1
	Correct index for x so $A x^{-2}$ or $\frac{A}{x^2}$ o.e. for any value of A	B1
	$= \frac{1}{4x^2}$ or $0.25 x^{-2}$	A1 cao
		(3)
(4 marks)		

Question	Scheme			Marks
15(i)	$(5 - \sqrt{8})(1 + \sqrt{2})$			
	$= 5 + 5\sqrt{2} - \sqrt{8} - 4$			M1
	$= 5 + 5\sqrt{2} - 2\sqrt{2} - 4$	$\sqrt{8} = 2\sqrt{2}$, seen or implied at any point.		B1
	$= 1 + 3\sqrt{2}$	$1 + 3\sqrt{2}$ or $a = 1$ and $b = 3$.		A1
				(3)
(ii)	Method 1	Method 2	Method 3	
	Either $\sqrt{80} + \frac{30}{\sqrt{5}}\left(\frac{\sqrt{5}}{\sqrt{5}}\right)$	Or $\left(\frac{\sqrt{400} + 30}{\sqrt{5}}\right)\frac{\sqrt{5}}{\sqrt{5}}$	$\sqrt{80} + \frac{\sqrt{900}}{\sqrt{5}} = \sqrt{80} + \sqrt{180}$	M1
	$= 4\sqrt{5} + \dots$	$= \left(\frac{20 + \dots}{\dots}\right)\dots$	$= 4\sqrt{5} + \dots$	B1
	$= 4\sqrt{5} + 6\sqrt{5}$	$= \left(\frac{50\sqrt{5}}{5}\right)$	$= 4\sqrt{5} + 6\sqrt{5}$	
	$= 10\sqrt{5}$			A1
				(3)
(6 marks)				

Question	Scheme	Marks
16(a)	$\left\{ (32)^{\frac{3}{5}} \right\} = (\sqrt[5]{32})^3 \text{ or } \sqrt[5]{(32)^3} \text{ or } 2^3 \text{ or } \sqrt[5]{32768}$	M1
	$= 8$	A1
		(2)
(b)	$\left\{ \left(\frac{25x^4}{4} \right)^{-\frac{1}{2}} \right\} = \left(\frac{4}{25x^4} \right)^{\frac{1}{2}} \text{ or } \left(\frac{5x^2}{2} \right)^{-1} \text{ or } \frac{1}{\left(\frac{25x^4}{4} \right)^{\frac{1}{2}}}$	M1
	$= \frac{2}{5x^2} \text{ or } \frac{2}{5}x^{-2}$	A1
		(2)
(4 mark)		

Question	Scheme	Marks
17	$\left\{ \frac{2}{\sqrt{12} - \sqrt{8}} \right\} = \frac{2}{(\sqrt{12} - \sqrt{8})} \times \frac{(\sqrt{12} + \sqrt{8})}{(\sqrt{12} + \sqrt{8})}$ Writing this is sufficient for M1.	M1
	$= \frac{2(\sqrt{12} + \sqrt{8})}{12 - 8}$ For 12 – 8. This mark can be implied.	A1
	$= \frac{2(2\sqrt{3} + 2\sqrt{2})}{12 - 8}$	B1 B1
	$= \sqrt{3} + \sqrt{2}$	A1 cso
(5 marks)		

Question	Scheme	Marks
18	$64x^2$ for $64x^2$ (B1 for 64 or x^2)	B2
(2 marks)		

Question	Scheme	Marks
19(a)	x^2	B1cao
		(1)
(b)	for $4^3(=64)$ or $y^3 \times \frac{2}{3} (=y^2)$	M1
	$64y^2$	A1cao
		(2)
(c)	$a = 3, b = -2, n = 4$ for all 3 correct values (B1 for 2 correct values)	B2
		(2)
(d)	for one correct expansion or use of difference of 2 squares	M1
	$24y$	A1cao
		(2)
(7 marks)		

Question	Scheme		Marks
20(i) Way 1	$\sqrt{48} = \sqrt{16}\sqrt{3}$ or $\frac{6}{\sqrt{3}} = 6\frac{\sqrt{3}}{3}$	Writes one of the terms of the given expression correctly in terms of $\sqrt{3}$	M1
	$\Rightarrow \sqrt{48} - \frac{6}{\sqrt{3}} = 2\sqrt{3}$	A correct answer of $2\sqrt{3}$. A correct answer with no working implies both marks.	A1
			(2)
(i) Way 2	$\sqrt{48} = 2\sqrt{12}$ or $\frac{6}{\sqrt{3}} = \sqrt{12}$	Writes one of the terms of the given expression correctly in terms of $\sqrt{12}$	M1
	$2\sqrt{12} - \sqrt{12} = \sqrt{12} = 2\sqrt{3}$	A correct answer of $2\sqrt{3}$. A correct answer with no working implies both marks.	A1
			(2)
(i) Way 3	$\sqrt{48} = \frac{12}{\sqrt{3}}$ or $\sqrt{48} = \frac{\sqrt{144}}{\sqrt{3}}$	Writes $\sqrt{48}$ correctly as $\frac{12}{\sqrt{3}}$ or $\frac{\sqrt{144}}{\sqrt{3}}$	M1
	$\frac{12}{\sqrt{3}} - \frac{6}{\sqrt{3}} = \frac{6}{\sqrt{3}} = 2\sqrt{3}$	A correct answer of $2\sqrt{3}$. A correct answer with no working implies both marks.	A1
			(2)
(i) Way 4	$\sqrt{48} - \frac{6}{\sqrt{3}} = \frac{\sqrt{3}\sqrt{48} - \dots}{\sqrt{3}} = \frac{12 - \dots}{\sqrt{3}}$ or $\sqrt{48} - \frac{6}{\sqrt{3}} = \frac{\sqrt{3}\sqrt{48} - \dots}{\sqrt{3}} = \frac{\sqrt{144} - \dots}{\sqrt{3}}$	Writes $\sqrt{48}$ correctly as $\frac{12}{\sqrt{3}}$ or $\frac{\sqrt{144}}{\sqrt{3}}$	M1
	$\frac{12 - 6}{\sqrt{3}} = \frac{6}{\sqrt{3}} = 2\sqrt{3}$	A correct answer of $2\sqrt{3}$. A correct answer with no working implies both marks.	A1
			(2)

Question	Scheme		Marks
(ii) Way 1	$81 = 3^4$ or $\log_3 81 = 6x - 3$	For $81 = 3^4$ or $\log_3 81 = 6x - 3$. This may be implied by subsequent work.	B1
	$3^{6x-3} = 3^4$ or $\log_3 81 = 6x - 3$ $\Rightarrow 4 = 6x - 3 \Rightarrow x = \dots$	Solves an equation of the form $6x - 3 = k$ where k is their power of 3.	M1
	$\Rightarrow x = \frac{4+3}{6} = \frac{7}{6}$	$\frac{7}{6}$ or $1\frac{1}{6}$ or 1.16 with a dot over the 6	A1
			(3)
Way 2	$3 = 81^{\frac{1}{4}}$	For $3 = 81^{\frac{1}{4}}$. This may be implied by subsequent work.	B1
	$81^{\frac{6x-3}{4}} = 81 \Rightarrow \frac{6x-3}{4} = 1 \Rightarrow x = \dots$	Solves an equation of the form $k(6x - 3) = 1$ where k is their power of 81.	M1
	$\Rightarrow x = \frac{4+3}{6} = \frac{7}{6}$	$\frac{7}{6}$ or $1\frac{1}{6}$ or 1.16 with a dot over the 6	A1
			(3)
Way 3	$81 = 9^2$ and $3 = 9^{\frac{1}{2}}$	For $81 = 9^2$ and $3 = 9^{\frac{1}{2}}$. This may be implied by subsequent work.	B1
	$9^{\frac{6x-3}{2}} = 9^2 \Rightarrow \frac{6x-3}{2} = 2 \Rightarrow x = \dots$	Solves an equation of the form $p(6x - 3) = q$ where p is their power of 9 for the 3 and q is their power of 9 for the 81.	M1
	$\Rightarrow x = \frac{4+3}{6} = \frac{7}{6}$	$\frac{7}{6}$ or $1\frac{1}{6}$ or 1.16 with a dot over the 6	A1
			(3)
Way 4	$3^{6x-3} = 3^{6x} \times 3^{-3}$	For writing 3^{6x-3} correctly in terms of 3^{6x}	B1
	$3^{6x} = 81 \times 3^3 = 3^7$ $\Rightarrow 6x = 7 \Rightarrow x = \dots$	Solves an equation of the form $6x = k$ where k is their $3^3 \times 81$ written as a power of 3.	M1
	$\Rightarrow x = \frac{7}{6}$	$\frac{7}{6}$ or $1\frac{1}{6}$ or 1.16 with a dot over the 6	A1
			(3)
Way 5	$\log 3^{6x-3} = \log 81$	Takes logs of both sides	B1
	$6x - 3 = \frac{\log 81}{\log 3}$ $6x - 3 = 4 \Rightarrow x = \dots$	Solves an equation of the form $6x - 3 = k$ where k is their $\frac{\log 81}{\log 3}$	M1
	$\Rightarrow x = \frac{7}{6}$	$\frac{7}{6}$ or $1\frac{1}{6}$ or 1.16 with a dot over the 6	A1
			(3)
(5 marks)			