LEVEL 2

WJEC Level 2 Additional Mathematics

Approved by Qualifications Wales

Sample Assessment Materials

Unit 2: Calculus

Teaching from 2026
For award from 2027

This Qualifications Wales regulated qualification is not available to centres in England.

Made for Wales.
Ready for the world.

WJEC would like to thank the students and teachers of Fitzalan High School, Cardiff and Llanwern High School, Newport for their participation in the creation of these covers.

Contents

Question paper	1
Mark scheme	8
Mapping grid	12

Surname	Centre number	Candidate number
First name(s)		0

Level 2

5322U2

Additional Mathematics – Unit 2 Calculus

50 minutes

SAMPLE ASSESSMENT MATERIALS

Additional materials

The use of a calculator will be required for this examination.

Instructions to candidates

Use black ink or black ball-point pen. Do **not** use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces provided at the top of this page.

Answer **all** the questions in the spaces provided.

Write your answers in the spaces provided in this booklet. If you need more space, use the additional page(s) at the back of this booklet, taking care to number the question(s) correctly.

For examiner's use only		
Question	**Maximum mark**	**Mark awarded**
1.	**4**	
2.	**6**	
3.	**2**	
4.	**3**	
5.	**4**	
6.	**7**	
7.	**4**	
8.	**5**	
9.	**5**	
Total	**40**	

Information for candidates

The number of marks is given in brackets at the end of each question or part-question.

Answer **all** questions.

Examiner only

1. Find $\frac{\mathrm{d}y}{\mathrm{d}x}$ for **each** of the following.

(a) $y = 6x^8 + 3 + 4x^{-1}$ [3]

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

2. Find $\int (14x^6 + 16x^3 - 5 + \frac{6}{x^3})\,\mathrm{d}x$.

Simplify your answer.
You must show all your working. [6]

3. Find $\frac{d^2y}{dx^2}$ when $y = 3x^{15}$. [2]

Examiner only

.....

.....

.....

.....

.....

4. (a) Calculate the gradient of the curve $y = 4x^3 - x$ at the point (3, 105). [2]

.....

.....

.....

.....

.....

(b) A straight line intersects the curve $y = 4x^3 - x$ at the point (3, 105) and is perpendicular to the curve at this point.

Write down the gradient of this line. [1]

.....

.....

.....

Examiner only

5. Evaluate $\int_1^2 (4x^3 + 8x)\,\mathrm{d}x$.

You **must** show all your working. [4]

6. Find the coordinates and nature of each of the stationary points on the curve

$$y = 2x^3 - 3x^2 + 5.$$

You **must** show all your working. [7]

7. Given the following facts, find the values of a, b, c and d. [4]

- $y = ax^3 + bx^2 + cx + d$
- $\frac{dy}{dx} = 15x^2 + 6x + 1$
- $y = 10$ when $x = 0$

Examiner only

…….

…….

…….

…….

…….

…….

…….

a = ……. b = ……. c = ……. d = …….

8. Find the equation of the tangent to the curve $y = 3x^2 - 5x + 1$ at the point where $x = 2$. [5]

…….

…….

…….

…….

…….

…….

…….

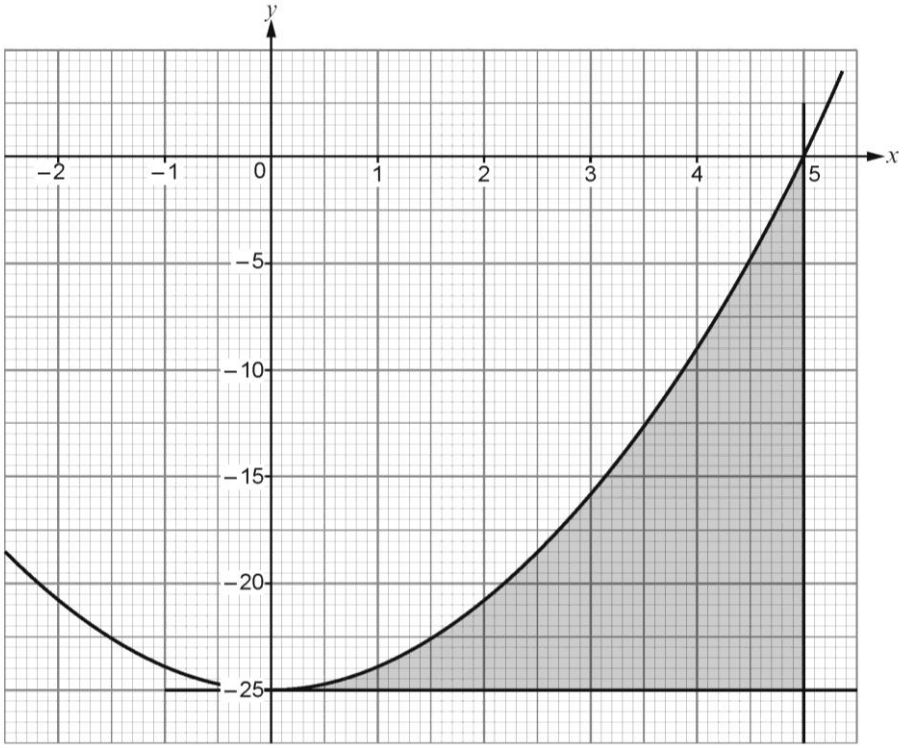
…….

…….

…….

Examiner only

9. The graph of $y = x^2 - 25$ is shown below.



Calculate the area of the shaded region bounded by:

- $0 \leq x \leq 5$
- $y \geq -25$
- $y \leq x^2 - 25$

You **must** show all your working. [5]

……

……

……

……

……

……

……

……

……

……

END OF QUESTIONS

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.
	…… ……

MARK SCHEME

Level 2 Additional Mathematics Unit 2: Calculus SAMs		Mark	Comments
1(a)	$48x^7 - 4x^{-2}$ $(+0)$ or equivalent	B3	Or individual marks: B1 for $48x^7$ (not $8 \times 6x^7$), B1 for $-4x^{-2}$or $+-4x^{-2}$ or $+\frac{-4}{x^2}$ or $-\frac{4}{x^2}$ B1 for $+0$ (or blank) provided at least 1 other B1 awarded If B3 penalise further incorrect working –1, e.g. treat further incorrect work with $-4x^{-2}$ as ISW unless B3 *Penalise including '+c' -1 only once throughout both parts (a) and (b)*
1(b)	$-24x^{-9}$ or $-\frac{24}{x^9}$	B1	CAO. Index and coefficient need to be simplified. ISW *Penalise including '+c' -1 only once throughout both parts, (a) and (b)*
2	$\frac{14x^7}{7} + \frac{16x^4}{4} - 5x + \frac{6x^{-2}}{-2}$ $2x^7 + 4x^4 - 5x - 3x^{-2}$ or $2x^7 + 4x^4 - 5x - \frac{3}{x^2}$ + c (constant)	B4 B1 B1	B1 for each term ISW from correct unsimplified form CAO simplified form Mark final answer Awarded only if at least B1 is awarded for integration
3	$630x^{13}$	B2	B1 for any of the following: • sight of $45x^{14}$ • FT to 2nd B1 from $\frac{dy}{dx} = kx^n$ Ignore incorrect notation
4(a)	$\frac{dy}{dx} = 12x^2 - 1$ (when $x = 3$) gradient is 107	M1 A1	
4(b)	(Perpendicular gradient is) $-\frac{1}{107}$	B1	FT –1 'their (a)'
5	$\frac{4x^4}{4} + \frac{8x^2}{2}$ or $x^4 + 4x^2$ Use of correct limits 2 & 1 in correct order **and** intention to subtract (32 – 5 =) 27	M2 m1 A1	No workings, no marks Ignore sight of '+c' M1 one term correct. FT from M2 or M1 CAO. Must be from correct working

6	$\left(\frac{\mathbf{d}y}{\mathbf{d}x}=\right)\ \mathbf{6}x^{\mathbf{2}}-\mathbf{6}x$	B1	
	$\frac{\mathbf{d}y}{\mathbf{d}x}=0$ or $\mathbf{6}x^{\mathbf{2}}-\mathbf{6}x=\mathbf{0}$ or $\mathbf{6}x^{\mathbf{2}}=\mathbf{6}x$	M1	FT 'their $\frac{\mathbf{d}y}{\mathbf{d}x}$' in the form $\boldsymbol{ax^2\pm bx}$
	$\boldsymbol{x=0}$ with $\boldsymbol{y=5}$ $\boldsymbol{x=1}$ with $\boldsymbol{y=4}$	A1 A1	If A0 A0 award A1 for $\boldsymbol{x}=0$ with $\boldsymbol{x}=1$ *Answer only, no working shown M0 A0 A0*
	$\frac{\mathbf{d}^{\mathbf{2}}y}{\mathbf{d}x^{\mathbf{2}}}=\mathbf{12}x-\mathbf{6}$	M1	FT their $\frac{\mathbf{d}y}{\mathbf{d}x}$ in the form $\boldsymbol{ax^2\pm bx}$ Or first derivative test, interpretation of first derivative test. Or alternative (e.g. full graphical method with explanation)
	(0, (5)): $\frac{\mathbf{d}^{\mathbf{2}}y}{\mathbf{d}x^{\mathbf{2}}}<0$, point is a maximum	A1	FT for their $\boldsymbol{x}$ value
	(1, (4)): $\frac{\mathbf{d}^{\mathbf{2}}y}{\mathbf{d}x^{\mathbf{2}}}>0$, point is a minimum	A1	FT for their other $\boldsymbol{x}$ value provided this does not have the same interpretation as the first $\boldsymbol{x}$ value <u>Answer only, no working shown M0 A0 A0</u>
7	For sight of $\left(\frac{\mathrm{d}y}{\mathrm{d}x}=\right)\ 3ax^2+2bx+c$ or $(y=)\frac{15x^3}{3}+\frac{6x^2}{2}+x$ (+ constant)	B1	May be implied in further working
	$a=5$ $b=3$ $c=1$ $d=10$	B3	B2 for any 2 or 3 of the values correct B1 for 1 of the values correct Only accept embedded answers if unambiguous
8	When $x=2$, finding $y=3$	B1	
	$\frac{\mathrm{d}y}{\mathrm{d}x}=6x-5$	M1	
	(when $x=2$) gradient is 7	A1	Must be from sight of $\frac{\mathrm{d}y}{\mathrm{d}x}=6x-5$
	$3=7\times2+c$ with $c=-11$ or $y-3=7(x-2)$	M1	Method to form equation with appropriate substitution for at least two of x, y and m FT 'their y' value (but not $y=2$) and 'their derived gradient'
	$y=7x-11$ or equivalent	A1	CAO. Mark final answer

9	Intention to integrate $\frac{x^3}{3} - 25x$ Use of correct limits 5 & 0 in appropriate order and intention to subtract $-\frac{250}{3}$ or –83.33(…) (Area region = 25 × 5 – 83.33(…)) 41.66(…) or 41.7 or $41\frac{2}{3}$ or $\frac{125}{3}$ or equivalent	M1 A1 m1 A1 B1	Intention to integrate, hence not using given or differentiated expression Ignore sight of '+ *c*' There must be evidence of use of limits and subtraction CAO, must be from correct working Allow: • -83.3 from correct working • omission of '–' or limits used in reverse order if area is used correctly in further working Do not accept: • inclusion of '+ *c*' unless omitted in the final answer for area of the region FT 'their 83.33…' provided M1 m1 previously awarded Allow 41.6 from correct working <u>A correct answer without working is awarded</u> <u>M1 A0 m0 A0 B0 only (for intention to integrate)</u> No marks for use of the trapezium rule

How to read the mark scheme

- ‘M' marks are awarded for any correct method applied to appropriate working, even though a numerical error may be involved. Once earned they cannot be lost.
- ‘m’ marks are dependent method marks. They are only given if the relevant previous ‘M’ mark has been earned.
- ‘A' marks are given for a numerically correct stage, for a correct result or for an answer lying within a specified range. They are only given if the relevant M/m mark has been earned either explicitly or by inference from the correct answer.
- 'B' marks are independent of method and are usually awarded for an accurate result or statement.
- ‘S’ marks are awarded for strategy
- ‘E’ marks are awarded for explanation
- ‘U’ marks are awarded for units
- ‘P’ marks are awarded for plotting points
- ‘C’ marks are awarded for drawing curves
- ‘SC’ marks are awards for special cases
- CAO: correct answer only
- ISW: ignore subsequent working
- FT: follow through

Mapping grid

Question	Mark	Assessment objective		
		AO1	AO2	AO3
1(a)	3	3		
1(b)	1	1		
2	6	6		
3	2	2		
4(a)	2	2		
4(b)	1	1		
5	4	4		
6	7	7		
7	4		4	
8	5		5	
9	5			5
Total	**40**	**26**	**9**	**5**