

Surname	Centre Number	Candidate Number
Other Names		0



## WJEC LEVEL 2 CERTIFICATE

9550/01



S16-9550-01

## ADDITIONAL MATHEMATICS

A.M. TUESDAY, 21 June 2016

2 hours 30 minutes

### ADDITIONAL MATERIALS

A calculator will be required for this paper.

### INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

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

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

Take  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

### INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

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

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

When you are asked to show your working you must include enough intermediate steps to show that a calculator has not been used.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	8	
2.	5	
3.	4	
4.	5	
5.	8	
6.	7	
7.	10	
8.	7	
9.	5	
10.	8	
11.	5	
12.	11	
13.	6	
14.	4	
15.	7	
<b>Total</b>	<b>100</b>	

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

[2]

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

[2]

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

$$x^2 + 12x + 49.$$

[3]

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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]

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

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

[3]

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

[1]

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

[1]

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6. (a) Simplify  $\frac{3}{5+\sqrt{2}}$ , leaving your answer in surd form.

**Do not** use a calculator to answer this question.  
You **must** show all your working.

[3]

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- (b) Showing all your working, simplify each of the following.

(i) 
$$\frac{x^{-\frac{2}{5}} \times x^{\frac{17}{5}}}{x^{\frac{1}{2}}}$$

[2]

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(ii) 
$$\frac{8x^{\frac{1}{9}} + x^{\frac{2}{9}}}{x^{\frac{2}{9}}}$$

[2]

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9. Do **not** use a calculator to answer any part of this question.  
You must show all your working.

(a) Simplify  $\frac{\cos 45^\circ}{\sin 45^\circ}$ .

[1]

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(b) Express  $\frac{\sin 30^\circ}{\tan 60^\circ}$  in the form  $\frac{\sqrt{a}}{b}$ , where  $a$  and  $b$  are integers to be found.

[2]

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(c)  $(\sin 60^\circ)^2$  is written  $\sin^2 60^\circ$ .  
Simplify  $\sin^2 60^\circ + \tan^2 45^\circ$ .

[2]

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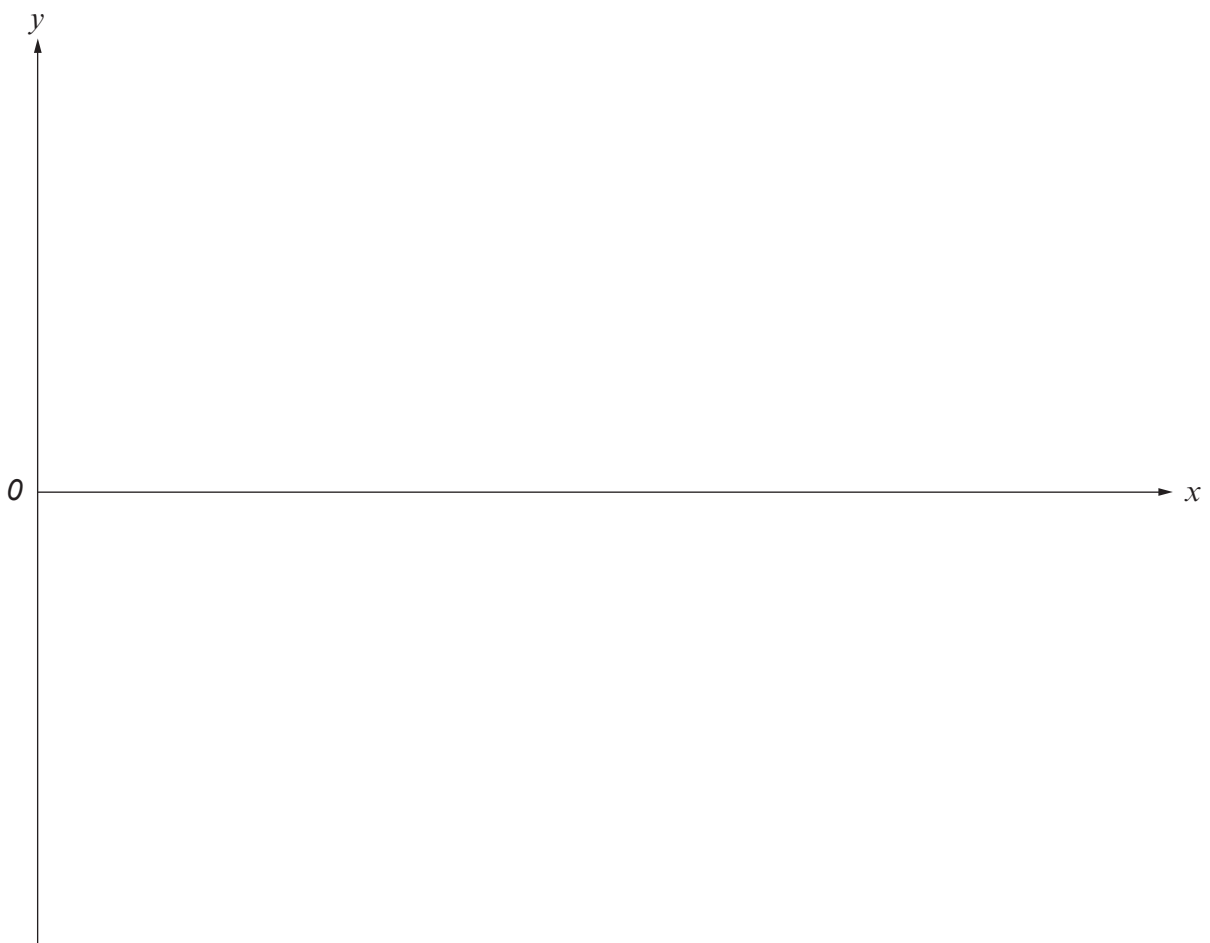
11. (a) Use the axes below to sketch the graph of  $y = -3\cos x + 5$  for values of  $x$  from  $0^\circ$  to  $360^\circ$ . You must label any important values on the axes. [3]

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- (b) State the maximum and minimum values of  $y = -3\cos x + 5$ . [2]

Maximum value .....

Minimum value .....

12. (a) Find  $\frac{d^2y}{dx^2}$  when  $y = 3x^7 + 4x$ .

[2]

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(b) Find  $\int(4x^3 + 2x + 4x^{-2})dx$ .

[4]

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(c) Showing all your working, evaluate  $\int_2^3(8x + 2)dx$ .

[5]

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