MATHEMATICS

Task A- Extension test

Practice Test

Time allowed - 50 minutes

Read Carefully

1. Full credit will be given only where the solution contains appropriate working.
2. **Calculators may be used.**
3. Answers obtained by readings from scale drawings will not receive any credit.
4. **This Unit Test contains questions graded at all levels.**

1. The equation of a line is Find the equation of the perpendicular line going through the point (3,1).

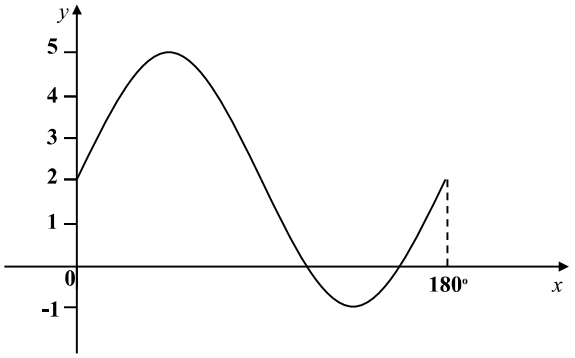
2

2. Two functions, f and g, are defined on suitable domains as and .

Find the value of . **2**

3. Find the gradient of the tangent to the curve at the point (2, 22). **2**

4. The diagram shows part of the graph .



Find the correct values of a, b and c? **2**

5. For the recurrence relation with and ,

find the value of . **2**

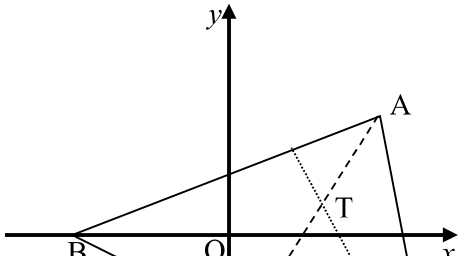
6. Two functions are defined on suitable domains and are given as

and .

Show clearly that . **3**

7. Triangle ABC has vertices A(9, 8), Band C(10,

(a) Show clearly that the equation of the median through A is



(b) The line through C with gradient meets the median through A at the point T.

Establish the coordinates of T. **4**

8. Given that , find **4**

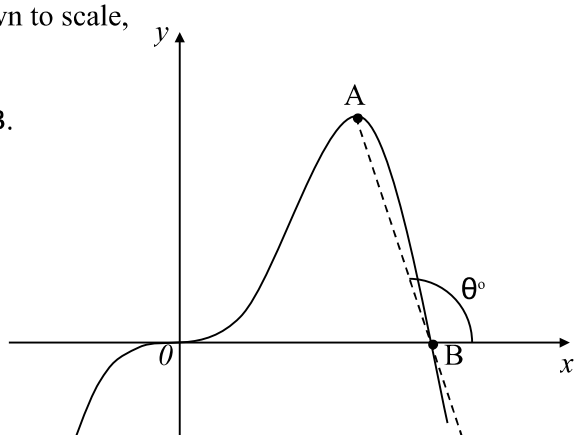
9. A recurrence relation is defined as , with

(a) Find the limit (L) of the sequence generated by this recurrence relation. **1**

(b) Find the smallest value of n such that **3**

10. The curve shown in the diagram, which is not drawn to scale, has equation

It has a turning point at A and cuts the x – axis at B.



(a) Find the coordinates of the points A and B. **6**

(b) The line joining A and B makes an angle of
θ^o with the positive direction of the x – axis.
Calculate the value of θ correct to the nearest degree.
3

(11.) The point with coordinates (16, 3) lies on the graph with equation

Find the value of a. **2**

END OF QUESTION PAPER

Higher Task A Extension Practice **Marking Scheme**

	Give 1 mark for each •	Illustration(s) for awarding each mark
1	**$y-3 = \frac{3}{4}(x-1)$**	**2 marks**
2	**19**	**2 marks**
3	**27**	**2 marks**
4	**a = 3, b = 2, c = 2**	**3 marks**
5	**20**	**2 marks**
6(a)	**ans: proof (3 marks)** ●¹ knows to substitute ●² squares bracket correctly ●³ simplifies to required form	 ●¹ ●² ●³
7(a)	**ans: proof (4 marks)** ●¹ finds midpoint of BC ●² finds gradient ●³ substitutes into ●³ or ●⁴ rearranges to required form	 ●¹ ●² ●⁴
(b)	**ans: T(5, 2) (4 marks)** ●¹ establishes equation of second line ●² knows to use simultaneous equations ●³ solves for x and y ●⁴ states coordinates of T	 ●¹ ●² evidence ●³ $x = 5$; $y = 2$ ●⁴ T(5, 2)
8	**ans: (4 marks)** ●¹ brings power up ●² prepares to differentiate ●³ differentiates first term ●⁴ differentiates second term	 ●¹ ●² ●³ 1…… ●⁴ ….. **Note:** mark 4 can only be awarded when differentiating a negative power.

	Give 1 mark for each •	Illustration(s) for awarding each mark
9(a)	**ans: 30 (1 mark)** ●¹ finds limit	 ●¹

(b) **ans:** $n = 3$ **(3 marks)**

●[1]	knows to find subsequent terms	●[1]	
●[2]	continues sequence	●[2]	
●[3]	states smallest value of n	●[3]	$n = 3$

10(a) **ans:** **A(3, 54); B(4, 0)** **(6 marks)**

●[1]	knows to differentiate	●[1]	
●[2]	equates derivative to 0	●[2]	
●[3]	solves for x	●[3]	
●[4]	finds y coordinate	●[4]	A(3, 54)
●[5]	makes equation equal to 0	●[5]	
●[6]	solves to find B	●[6]	B(4, 0)

(b) **ans:** **91°** **(3 marks)**

●[1]	finds gradient of AB	●[1]	
●[2]	knows to take	●[2]	=…….
●[3]	answer correctly rounded	●[3]	91°

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11 **ans:** $a = 4$ **(2 marks)**

●[1]	substitutes for x and y	●[1]	
●[2]	solves for	●[2]	

Total: 40 marks