Pearson Edexcel AS Mathematics 8MA0

Practice Paper B

Time allowed: 2 hours

School: www.CasperYC.club

Name:

Teacher:

How I can achieve better:

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Question	Points	Score
1	3	
2	3	
3	4	
4	6	
5	6	
6	6	
7	7	
8	8	
9	8	
10	8	
11	9	
12	13	
13	19	
Total:	100	



1. A teacher asks one of her students to solve the equation $2\cos(2x) + \sqrt{3} = 0$ for $0 \le x \le 180^{\circ}$. The attempt is shown below.

$$2\cos(2x) = -\sqrt{3}$$

$$\cos(2x) = -\frac{\sqrt{3}}{2}$$

$$2x = \cos^{-1}\left(-\frac{\sqrt{3}}{2}\right)$$

$$2x = 150^{\circ}$$

$$x = 75^{\circ}$$
or $x = 360^{\circ} - 75^{\circ} = 295^{\circ}$ so reject as out of range.

- (a) Identify the mistake made by the student.
- (b) Write down the correct solutions to the equation.

Total: 3

[1]

[2]

[3]



3.	Simplify
	$\frac{6\sqrt{3}-4}{8-\sqrt{3}},$
	giving your answer in the form $p\sqrt{3}-q$, where p and q are positive rational numbers.



(b) Show, by means of a counter example, that the inequality $1+3x^2+x^3<(1+x)^3$ is not true for all values of x .	[4
	[2
To	
	otal: (



[6]

	h'(x) =	$= 15x\sqrt{x} - \frac{40}{\sqrt{x}},$	
find $h(x)$.			
$\operatorname{mid} \operatorname{n}(x)$.			



[6]

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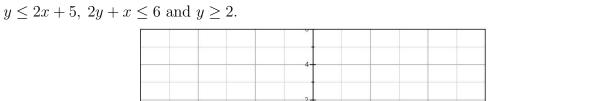


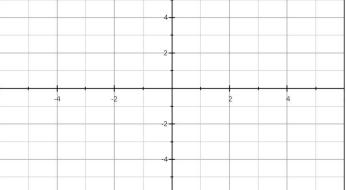
7.	(a)	Expand $(1+3x)^8$ in ascending powers of x, up to and including the term in x^3 , simplifying	[4]
		each coefficient in the expansion.	
	(b)	Showing your working clearly, use your expansion to find, to 5 significant figures, an ap-	[3]
		proximation for 1.03^8 .	
			Total: 7



8.	(a)	Sketch the graph $y = \log_9(x+a), a > 0$, for $x > -a$, labelling any asymptotes and points	[6]
		of intersection with the x -axis or y -axis. Leave your answers in terms of a where necessary.	
	(b)	For $x > -a$, describe, with a reason, the relationship between the graphs of $y = \log_9(x+a)^2$	[2]
		and $y = \log_9(x+a)$.	
			Total: 8
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9. (a) On the grid shade the region comprising all points whose coordinates satisfy the inequalities





(b) Work out the area of the shaded region.

Total:	8

[5]

[3]

[2]

[3]

Total: 8

10. A particle P of mass 6 kg moves under the action of two forces, F_1 and F_2 , where

$$F_1 = (8\mathbf{i} - 10\mathbf{j})N$$
 and $F_2 = (p\mathbf{i} + q\mathbf{j})N$

p and q are constants.

The acceleration of P is $a = (3\mathbf{i} - 2\mathbf{j}) \text{ ms}^{-2}$.

- (a) Find, to 1 decimal place, the angle between the acceleration and **i**.
- (b) Find the values of p and q.
- (c) Find the magnitude of the resultant force R of the two forces F_1 and F_2 . Simplify your answer fully.



Total: 9

11	
11.	

$$f(x) = x^3 - 7x^2 - 24x + 18.$$

- (a) Sketch the graph of the gradient function, y = f'(x).
- (b) Use algebraic methods to determine any points where the graph cuts the coordinate axes and mark these on the graph.
- (c) Using calculus, find the coordinates of any turning points on the graph.

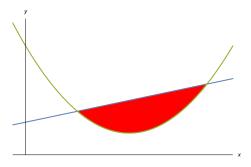


(Q11 continued)	



[5]

12. The diagram shows part of curve with equation $y = x^2 - 8x + 20$ and part of the line with equation y = x + 6.



- (a) Using an appropriate algebraic method, find the coordinates of A and B.
- (b) The x-coordinates of A and B are denoted x_A and x_B respectively. [2] Find the exact value of the area of the finite region bounded by the x-axis, the lines $x = x_A$ and $x = x_B$ and the line AB.
- (c) Use calculus to find the exact value of the area of the finite region bounded by the x-axis, the lines $x = x_A$ and $x = x_B$ and the curve $y = x^2 8x + 20$.
- (d) Hence, find, to one decimal place, the area of the shaded region enclosed by the curve $y = x^2 8x + 20$ and the line AB.

		Total

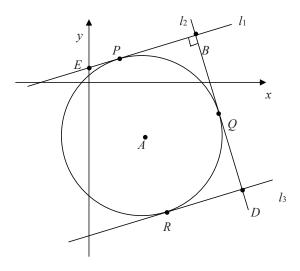
(Q12 continued \dots)			



13. A is the centre of circle C, with equation $x^2 - 8x + y^2 + 10y + 1 = 0$.

P, Q and R are points on the circle and the lines l_1, l_2 and l_3 are tangents to the circle at these points respectively.

Line l_2 intersects line l_1 at B and line l_3 at D.



(a) Find the centre and radius of C.

[3]

[4]

[4]

[4]

- (b) Given that the x-coordinate of Q is 10 and that the gradient of AQ is positive, find the y coordinate of Q, explaining your solution.

(c) Find the equation of l_2 , giving your answer in the form y = mx + b.

- (d) Given that APBQ is a square, find the equation of l_1 in the form y = mx + b.
- [4]

(e) l_1 intercepts the y-axis at E. Find the area of triangle EPA.

Ί	ota	ıl:	19

(Q13 continued \dots)		

