Solomon Practice Paper

Pure Mathematics 1K

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	5	
2	5	
3	8	
4	9	
5	9	
6	12	
7	12	
8	15	
Total:	75	

How I can achieve better:

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1.	(a) Express each of the following in the form 3^p , where p is a function of x : i. 9^{2x-3}	[3]
	ii. 27^{x+2}	
	(b) Hence, or otherwise, solve the equation	[2]
	$9^{2x-3} = 27^{x+2}.$	
	2	
		Total: 5

2.	(a) Given that	[3]
	$x^2 - 5x + 6 \equiv A(x+B)^2 + C,$	
	find the values of A, B and C .	
	(b) Hence, or otherwise, write down the coordinates of the turning point of the curve wit equation	th [2]
	$y = x^2 - 5x + 6.$	
		Total: 5
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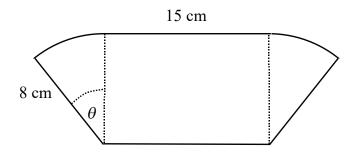
3.	The curve $y = 2\sin(3x + k)$, with x measured in degrees, passes through the point $(10, \sqrt{3})$.	
	(a) Given that $0 < k < 90^{\circ}$, show that $k = 30$.	[3]
	(b) Solve the equation $y = \sqrt{2}$ for values of x in the interval $0 \le x \le 180^{\circ}$	[5]
	(2) 10 2 1 2 2 2 3 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	Total: 8
		10tar. 6

4.	The line l passes through the points $A(5,1)$ and $B(11,19)$.	
	(a) Find the equation of the line l in the form $ax + by + c = 0$.	[3]
	The line m passes through the midpoint of AB and has a gradient of $\frac{2}{3}$.	
	(b) Find an equation of the line m .	[3]
	(c) Find the area of the triangle enclosed by the lines l, m and the y-axis.	[3]
		Total: 9
		rotar. 9

[3]

[4]

5. Figure shows a component cut from a metal sheet.



The shape consists of a rectangle of width 15 cm and two circular sectors of radius 8 cm and angle θ .

- (a) Given that the perimeter of the shape is 57.4 cm, show that $\theta = 0.7125$ radians.
- (b) Calculate the area of the shape correct to 2 decimal places. [2]



Figure shows how the component is made by cutting four pieces from a rectangular piece of metal sheet.

(c) Calculate the percentage of the rectangular sneet that is cut on.	[4]
	Total: 9
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[3]

[3]

[5]

[1]

12

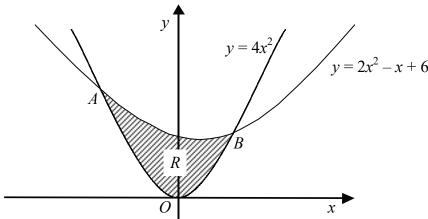
6.

$$f(x) \equiv 4x - 3 + \frac{9}{x}.$$

$f(x) \equiv 4x - 3 + \frac{9}{x}.$
(a) Prove that the equation $f(x) = 0$ has no real roots.
(b) Solve the equation $f'(x) = 0$.
(c) Hence, find the coordinates of the stationary points of the curve $y = f(x)$ and determine their nature.
(d) State the set of values of x for which $f(x)$ is an increasing function.
Total:



7. Figure shows the curves $y = 4x^2$ and $y = 2x^2 - x + 6$ which intersect at the points A and B.



(a) Find the coordinates of the points A and B. [5]
(b) Find, using integration, the area of the shaded region, R, enclosed by the two curves. [7]

Total: 12

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 (b) The 3rd, 4th and 5th terms of a geometric series are given by (x + 4), (4x - 5) and (2x + 1) respectively. i. Show that one possible value of x is ½, and find the other possible value. ii. Find the common ratio and first term of the series for which x = ½. iii. Find the sum to infinity of this series. 	[10] : 15
ii. Find the common ratio and first term of the series for which $x = \frac{1}{2}$.	: 15
ii. Find the common ratio and first term of the series for which $x = \frac{1}{2}$.	: 15
	: 15
v	: 15
Total	. 10
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