Solomon Practice Paper

Pure Mathematics 1A

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	6	
2	6	
3	7	
4	8	
5	9	
6	13	
7	13	
8	13	
Total:	75	

How I can achieve better:

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[6]

1.	1. Find the pairs of values (x, y) which satisfy the simultaneous equations:			
	2x - y = 1			
	$4x^2 + 4y + y^2 = 9$			
	$\mathbf{q}x + \mathbf{q}y + y = 0$			

2. ((a)	Prove	that	the	quadratic	equation
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$$x^2 + (m-1)x + m + 2 = 0$$

has real and distinct roots when

$$m^2 - 6m - 7 > 0.$$

(b) Hence, or otherwise, find the set of values of m for which

$$x^2 + (m-1)x + m + 2 = 0$$

has real and distinct roots.

Total:	6

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3.	The first three terms of an arithmetic series are $(3p-5), (2p-2)$ and $(5p-1)$ respectively.				
	(a) Find the value of p.				
	(b) Hence, find the sum of the first 10 terms of the series.	[4]			
		Total: 7			
		iotai: 1			

Last updated: May 5, 2023

1.	(a) Show that the equation	[2]
	$2\sin^2(x) - \cos(x) = 1$	
	can be written as	
	$2\cos^2(x) + \cos(x) - 1 = 0.$	
	(b) Using your answer to part (a), find all the solutions of the equation	[6]
	$2\sin^2(x) - \cos(x) = 1$	
	in the interval $0 \le x \le 2\pi$, giving your answers in terms of π .	
		Total: 8

Last updated: May 5, 2023

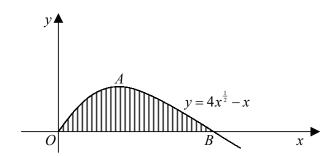
5.

$$f(x) \equiv x^3 - 5x^2 + 7x - 2.$$

$f(x) \equiv x^3 - 5x^2 + 7x - 2.$	
(a) Show that $x = 2$ is a solution of the equation $f(x) = 0$.	[2]
(b) Find the other solutions of the equation $f(x) = 0$, giving your answers correct to 2 decimal places.	[7]
	Total: 9

Last updated: May 5, 2023

6. Figure shows part of the curve with equation $y = 4x^{\frac{1}{2}} - x$.



A is the maximum point of the curve and the curve crosses the x - axis at the point B.

(a) Find the coordinates of the point A.

[5]

(b) Find the x - coordinate of the point B.

[3]

[5]

(c) Show that the area of the shaded region enclosed by the curve and the x - axis is $\frac{128}{3}$.

Total: 13

[3]

[2]

[3]

[5]

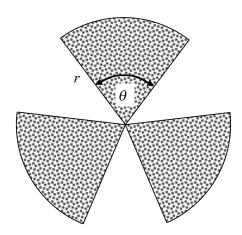
13

7. A and B are points with coordinates $(5,2)$ and $(-1,4)$ respectively.	
(a) Find the equation of the line l which passes through the points A and B in the form $px + qy + r = 0$.	
(b) Find the coordinates of the midpoint of AB .	
(c) Hence, or otherwise, find the equation of the perpendicular bisector of AB .	
C is the point with coordinates $(3,4)$.	
Given that the points A, B and C lie on the circumference of a circle, centre D ,	
(d) find the coordinates of the point D .	
Total	:

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8. Figure shows the design for a hazard warning-symbol.



It consists of three identical sectors of a circle of radius r centimetres. The sectors are equally spaced and each subtends an angle θ radians at the centre.

Given that the area of the symbol is to be 48 cm^2 ,

- (a) find an expression for θ in terms of r. [3]
- (b) Hence, show that the perimeter of the shape, P cm, is given by [3]

$$P = 6r + \frac{96}{r}.$$

Given that r can vary,

(c) find the value of r for which P is a minimum and the corresponding value of P .	[5]
(d) justify that your value of P is a minimum.	[2]
	Total: 13
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