

Solomon Practice Paper

Pure Mathematics 2H

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

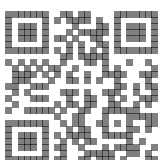
Question	Points	Score
1	6	
2	6	
3	7	
4	9	
5	10	
6	12	
7	12	
8	13	
Total:	75	

How I can achieve better:

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Last updated: May 5, 2023



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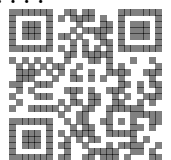
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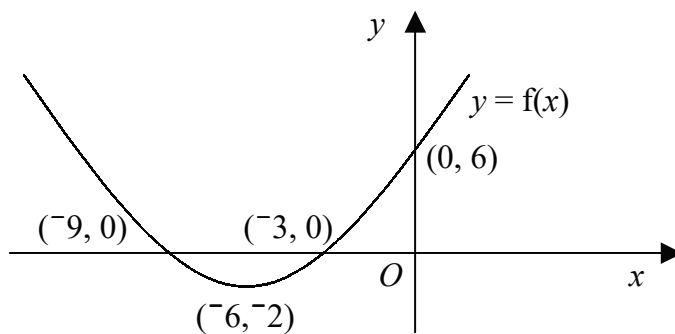
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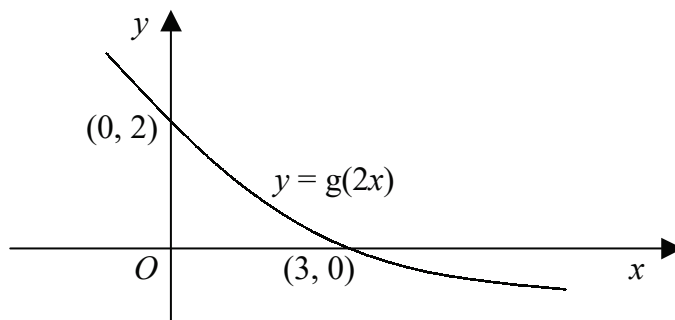


4. (a) Figure shows the curve $y = f(x)$ which has a minimum point with coordinates $(-6, -2)$. [6]
 The curve meets the coordinate axes at the points $(-9, 0)$, $(-3, 0)$ and $(0, 6)$.



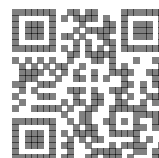
Showing the coordinates of any turning points and any points where each curve meets the coordinate axes, sketch on separate diagrams graphs of

- i. $y = f(x - 3)$,
 - ii. $y = 2 + \frac{1}{2}f(x)$.
- (b) Figure shows the curve $y = g(2x)$ which meets the coordinate axes at the points with coordinates $(3, 0)$ and $(0, 2)$. [3]



Showing the coordinates of any points where the curve meets the coordinate axes, sketch the graph $y = g(x)$.

Total: 9



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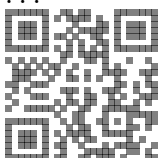
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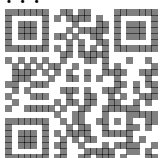
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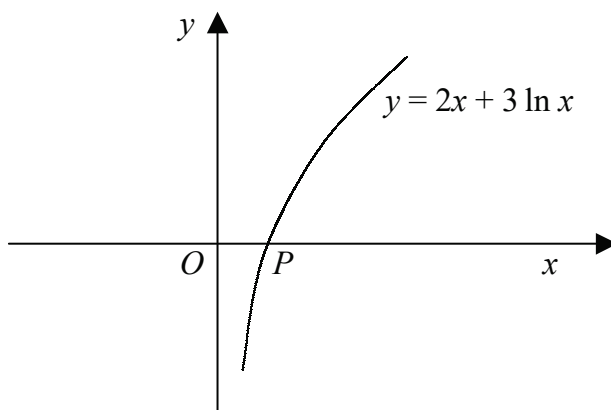
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6. Figure shows part of the curve with equation $y = 2x + 3 \ln(x)$.



The curve crosses the x -axis at the point P with coordinates $(p, 0)$.

(a) Show that $0.5 < p < 1$. [2]

(b) Using the iteration [3]

$$x_{n+1} = \sqrt{\frac{x_n^{\frac{1}{2}}}{e^{x_n}}}$$

and $x_1 = 0.5$, find the value of x_4 correct to 3 significant figures.

(c) Show that your answer to part (b) gives the value of p correct to 3 significant figures. [2]

The point Q with coordinates $(1, 2)$ lies on the curve.

(d) Find an equation of the tangent to the curve at Q . [5]

Total: 12

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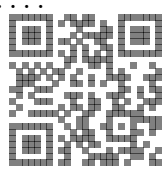
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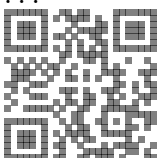
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7. The function f is given by

$$f: x \mapsto 2 \cos(x) + \sin(x), \quad x \in \mathbb{R}.$$

Given that $f(x)$ can be written as $R \cos(x - \alpha)$, where x is measured in degrees, $R > 0$ and $0 \leq \alpha \leq 90^\circ$,

(a) show that $R = \sqrt{5}$ and find the value of α correct to 1 decimal place, [5]

(b) state the range of $f(x)$. [1]

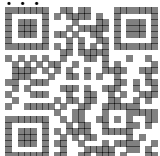
The function g is given by

$$g: x \mapsto \frac{8}{3+x}, \quad x \in \mathbb{R}, \quad x \neq -3.$$

(c) Find the range of $gf(x)$, giving the minimum and maximum values in the form $a + b\sqrt{5}$. [6]

Total: 12

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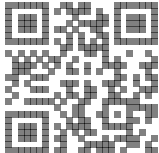
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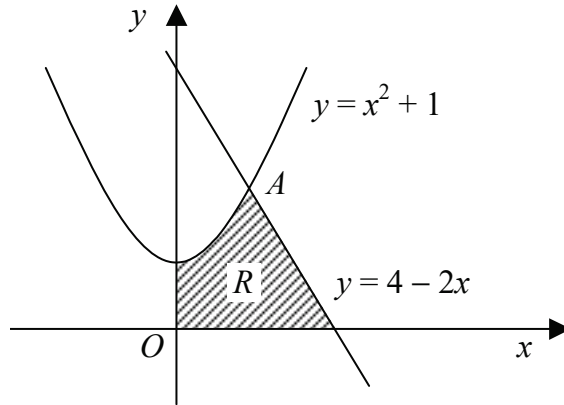
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8. Figure shows the curve $y = x^2 + 1$ and the line $y = 4 - 2x$.



A is the point of intersection of the curve and line with a positive x -coordinate.

(a) Show that the point A has coordinates $(1, 2)$. [3]

The shaded region, R , is enclosed by the curve, the line and the positive coordinate axes.

(b) Show that the volume of the solid generated when R is rotated through 2π radians about the x -axis is $\frac{16}{5}\pi$. [10]

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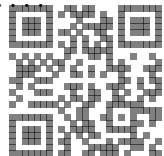
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