

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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1. Find, to an appropriate degree of accuracy, the values of x and y for which

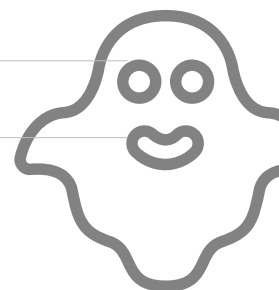
(a) $5^x = 10$,

[3]

(b) $\log_2(4^{2y}) = \log_3(27^{y+1})$.

[3]

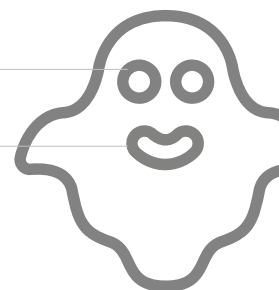
Total: 6



[6]

$$\int_{-2}^2 e^{\frac{1}{2}x+1} \, dx,$$

giving your answer correct to 3 significant figures.



[4]

$$f(x) \equiv 4x^2 - 4x + 3, \quad x \in \mathbb{R}.$$

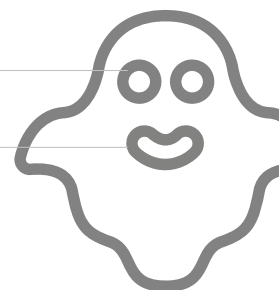
Prove that $|f(x)| = f(x)$ for all values of x .

[3]

$$g(x) \equiv x^2 + 6x + 4, \quad x \in \mathbb{R}.$$

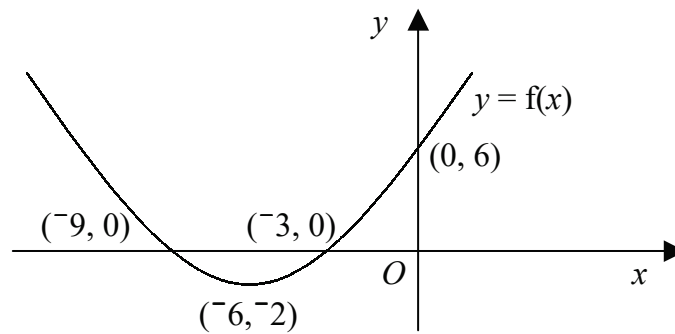
Prove that there are no real solutions to the equation $g(|x|) = 0$.

Total: 7



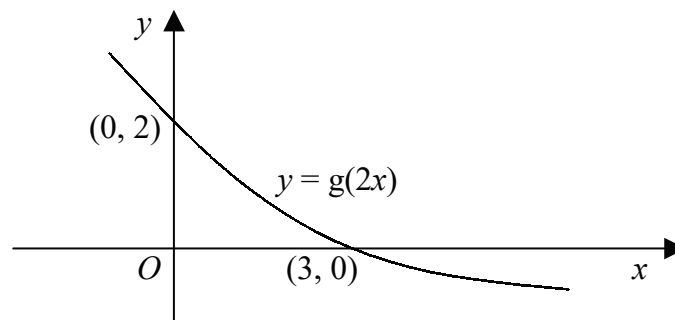


4. (a) Figure shows the curve $y = f(x)$ which has a minimum point with coordinates $(-6, -2)$. [6]
The curve meets the coordinate axes at the points $(-9, 0)$, $(-3, 0)$ and $(0, 6)$.



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

- $y = f(x - 3)$,
 - $y = 2 + \frac{1}{2}f(x)$.
- (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 $y = g(x)$.

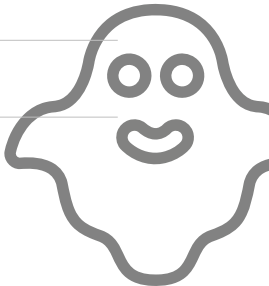
Total: 9





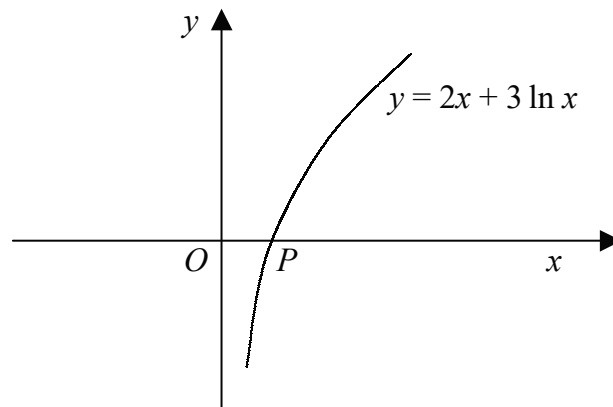
5. (a) Expand $(1+4x)^6$ in ascending powers of x as far as the term in x^3 , simplifying the coefficient in each term. [4]
- (b) Use your series to estimate the value of $(1.04)^6$ correct to 4 significant figures. [3]
- (c) Find the coefficient of x^2 in the expansion of $(2+x)(1+4x)^6$. [3]

Total: 10





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 $(p, 0)$.

- [2]

- [3]

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

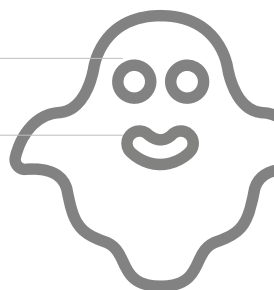
and $x_1 = 0.5$, find the value of x_4 correct to 3 significant figures.

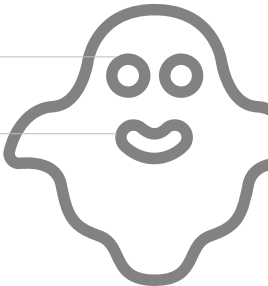
- [2]

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

- [5]

Total: 12





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

(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]

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

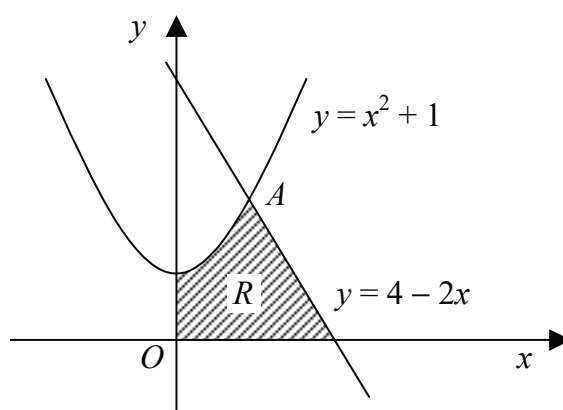
(c) Find the range of $\text{gf}(x)$, giving the minimum and maximum values in the form $a + b\sqrt{5}$. [6]

Total: 12





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]

Total: 13

