

Solomon Practice Paper

Core Mathematics 3H

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	6	
2	7	
3	7	
4	9	
5	10	
6	11	
7	12	
8	13	
Total:	75	

How I can achieve better:

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December 24, 2025

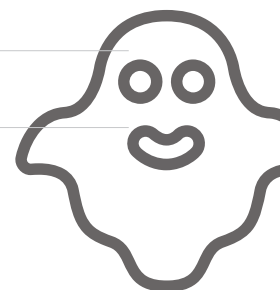


7.

$$f(x) = x^2 - 2x + 5, x \in \mathbb{R}, x \geq 1.$$

- (a) Express $f(x)$ in the form $(x + a)^2 + b$, where a and b are constants. [2]
- (b) State the range of f . [1]
- (c) Find an expression for $f^{-1}(x)$. [3]
- (d) Describe fully two transformations that would map the graph of $y = f^{-1}(x)$ onto the graph of $y = \sqrt{x}, x \geq 0$. [2]
- (e) Find an equation for the normal to the curve $y = f^{-1}(x)$ at the point where $x = 8$. [4]

Total: 12



8. A curve has the equation

$$y = \frac{e^2}{x} + e^x, x \neq 0.$$

(a) Find $\frac{dy}{dx}$. [2]

(b) Show that the curve has a stationary point in the interval $[1.3, 1.4]$. [3]

The point A on the curve has x -coordinate 2.

(c) Show that the tangent to the curve at A passes through the origin. [4]

The tangent to the curve at A intersects the curve again at the point B .

The x -coordinate of B is to be estimated using the iterative formula

$$x_{n+1} = -\frac{2}{3}\sqrt{3 + 3x_n e^{x_n - 2}},$$

with $x_0 = -1$.

(d) Find x_1, x_2 and x_3 to 7 significant figures and hence state the x -coordinate of B to 5 significant figures. [4]

Total: 13

