

Solomon Practice Paper

Core Mathematics 3F

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

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

How I can achieve better:

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4. A curve has the equation $x = y\sqrt{1 - 2y}$.

(a) Show that

$$\frac{dy}{dx} = \frac{\sqrt{1 - 2y}}{1 - 3y}.$$

[5]

The point A on the curve has y -coordinate -1 .

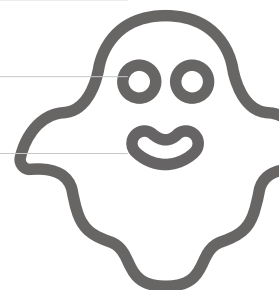
(b) Show that the equation of tangent to the curve at A can be written in the form

[3]

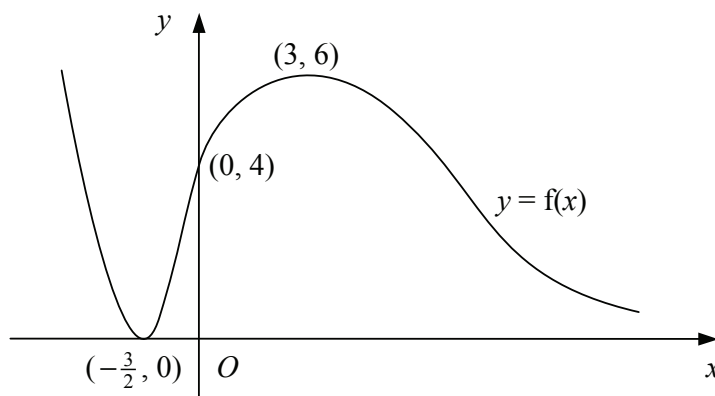
$$\sqrt{3}x + py + q = 0$$

where p and q are integers to be found.

Total: 8



6. Figure shows the curve $y = f(x)$ which has a minimum point at $(-\frac{3}{2}, 0)$, a maximum point at $(3, 6)$ and crosses the y -axis at $(0, 4)$.



Sketch each of the following graphs on separate diagrams. In each case, show the coordinates of any turning points and of any points where the graph meets the coordinate axes.

- (a) $y = f(|x|)$ [3]
- (b) $y = 2 + f(x + 3)$ [4]
- (c) $y = \frac{1}{2}f(-x)$ [4]

Total: 11





7.

$$f(x) = 1 + \frac{4x}{2x - 5} - \frac{15}{2x^2 - 7x + 5}, x \in \mathbb{R}, x < 1.$$

(a) Show that

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

(b) Find an expression for the inverse function $f^{-1}(x)$ and state its domain.(c) Solve the equation $f(x) = 2$.

[5]

[5]

[2]

Total: 12



8. A curve has the equation $y = x^2 - \sqrt{4 + \ln(x)}$.

(a) Show that the tangent to the curve at the point where $x = 1$ has the equation [5]

$$7x - 4y = 11.$$

The curve has a stationary point with x -coordinate α .

(b) Show that $0.3 < \alpha < 0.4$. [3]

(c) Show that α is a solution of the equation [2]

$$x = \frac{1}{2} (4 + \ln(x))^{-\frac{1}{4}}$$

(d) Use the iteration formula [3]

$$x_{n+1} = \frac{1}{2} (4 + \ln(x_n))^{-\frac{1}{4}}$$

with $x_0 = 0.35$, to find x_1, x_2, x_3 and x_4 , giving your answers to 5 decimal places.

Total: 13



