

Solomon Practice Paper

Core Mathematics 3B

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	7	
2	9	
3	9	
4	10	
5	13	
6	13	
7	14	
Total:	75	

How I can achieve better:

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2. A curve has the equation $y = \sqrt{3x + 11}$.

The point P on the curve has x -coordinate 3.

(a) Show that the tangent to the curve at P has the equation

[6]

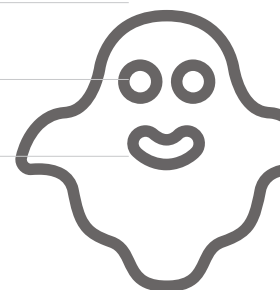
$$3x - 4\sqrt{5}y + 31 = 0.$$

The normal to the curve at P crosses the y -axis at Q .

(b) Find the y -coordinate of Q in the form $k\sqrt{5}$.

[3]

Total: 9



3. (a) Use the identities for $\sin(A + B)$ and $\sin(A - B)$ to prove that [4]

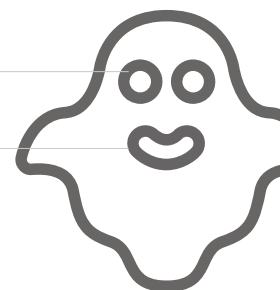
$$\sin(P) + \sin(Q) \equiv 2 \sin\left(\frac{P + Q}{2}\right) \cos\left(\frac{P - Q}{2}\right).$$

- (b) Find, in terms of π , the solutions of the equation [5]

$$\sin(5x) + \sin(x) = 0,$$

for x in the interval $0 \leq x < \pi$.

Total: 9



5.

$$f(x) \equiv 2x^2 + 4x + 2, \quad x \in \mathbb{R}, x \geq -1.$$

- (a) Express $f(x)$ in the form $a(x + b)^2 + c$. [2]
- (b) Describe fully two transformations that would map the graph of $y = x^2, x \geq 0$ onto the graph of $y = f(x)$. [3]
- (c) Find an expression for $f^{-1}(x)$ and state its domain. [4]
- (d) Sketch the graphs of $y = f(x)$ and $y = f^{-1}(x)$ on the same diagram and state the relationship between them. [4]

Total: 13



