

Solomon Practice Paper

Core Mathematics 1L

Time allowed: 90 minutes

Centre: www.CasperYC.club

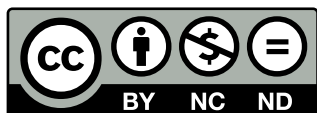
Name:

Teacher:

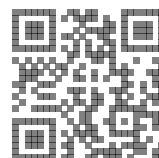
Question	Points	Score
1	3	
2	4	
3	6	
4	6	
5	8	
6	8	
7	8	
8	10	
9	11	
10	11	
Total:	75	

How I can achieve better:

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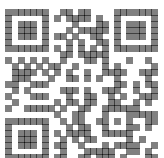


Last updated: May 5, 2023



1. Evaluate $49^{\frac{1}{2}} + 8^{\frac{2}{3}}$

[3]



2. A sequence is defined by the recurrence relation

$$u_{n+1} = \frac{u_n + 1}{3}, \quad n = 1, 2, 3, \dots,$$

Given that $u_3 = 5$,

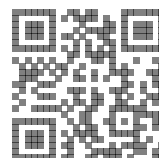
(a) find the value of u_4 ,

[1]

(b) find the value of u_1 .

[3]

Total: 4

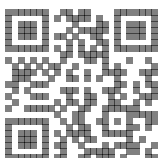


3.

$$f(x) = 4x^2 + 12x + 9.$$

- (a) Determine the number of real roots that exist for the equation $f(x) = 0$. [2]
- (b) Solve the equation $f(x) = 8$, giving your answers in the form $a + b\sqrt{2}$ where a and b are rational. [4]

Total: 6



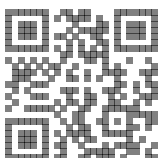
4. Find the set of values of x for which

(a) $6x - 11 > x + 4$, [2]

(b) $x^2 - 6x - 16 < 0$, [3]

(c) both $6x - 11 > x + 4$ and $x^2 - 6x - 16 < 0$. [1]

Total: 6



5.

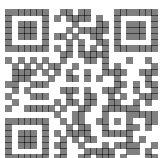
$$f(x) = (2 - \sqrt{x})^2, \quad x > 0.$$

(a) Solve the equation $f(x) = 0$. [2]

(b) Find $f(3)$, giving your answer in the form $a + b\sqrt{3}$, where a and b are integers. [2]

(c) Find $\int f(x) dx$. [4]

Total: 8



6. The straight line l passes through the point $P(-3, 6)$ and the point $Q(1, -4)$.

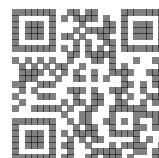
(a) Find an equation for l in the form $ax + by + c = 0$, where a, b and c are integers. [4]

The straight line m has the equation $2x + ky + 7 = 0$, where k is a constant.

Given that l and m are perpendicular,

(b) find the value of k . [4]

Total: 8



7. Given that

$$f'(x) = 5 + \frac{4}{x^2}, \quad x \neq 0,$$

(a) find an expression for $f(x)$.

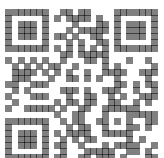
[3]

Given also that $f(2) = 2f(1)$,

(b) find $f(4)$.

[5]

Total: 8



8.

$$f(x) = x^3 - 6x^2 + 5x + 12.$$

(a) Show that

$$(x + 1)(x - 3)(x - 4) \equiv x^3 - 6x^2 + 5x + 12.$$

[3]

(b) Sketch the curve $y = f(x)$, showing the coordinates of any points of intersection with the coordinate axes.

[3]

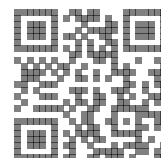
(c) Showing the coordinates of any points of intersection with the coordinate axes, sketch on separate diagrams the curves

[4]

i. $y = f(x + 3)$,

ii. $y = f(-x)$.

Total: 10



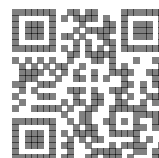
9. The first two terms of an arithmetic series are $(t - 1)$ and $(t^2 - 5)$ respectively, where t is a positive constant.

- (a) Find and simplify expressions in terms of t for [4]
- the common difference of the series,
 - the third term of the series.

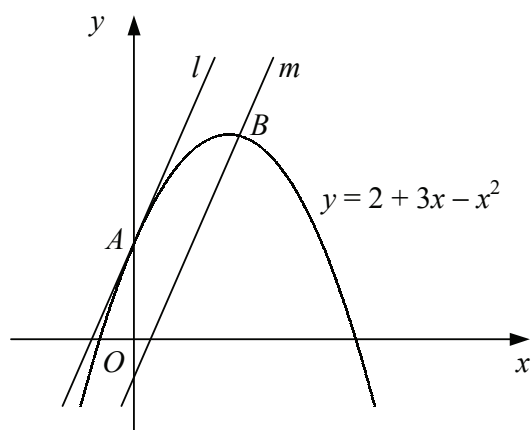
Given also that the third term of the series is 19,

- (b) find the value of t , [2]
- (c) show that the 10th term of the series is 75, [3]
- (d) find the sum of the first 40 terms of the series. [2]

Total: 11



10. Figure shows the curve with equation $y = 2 + 3x - x^2$ and the straight lines l and m .



The line l is the tangent to the curve at the point A where the curve crosses the y -axis

(a) Find an equation for l .

[5]

The line m is the normal to the curve at the point B .

Given that l and m are parallel,

(b) find the coordinates of B .

[6]

Total: 11

