

Solomon Practice Paper

Core Mathematics 1C

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	3	
2	4	
3	6	
4	6	
5	7	
6	7	
7	8	
8	8	
9	12	
10	14	
Total:	75	

How I can achieve better:

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Last updated: May 5, 2023

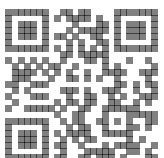


1. Solve the equation

$$x^2 - 4x - 8 = 0,$$

giving your answers in the form $a + b\sqrt{3}$ where a and b are integers.

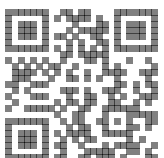
[3]



2. Find the set of values of x for which

[4]

$$(x - 1)(x - 2) < 20.$$

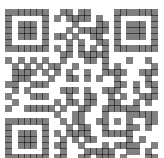


3. The curve with equation $y = f(x)$ passes through the point $(8, 7)$. Given that

[6]

$$f'(x) = 4x^{\frac{1}{3}} - 5,$$

find $f(x)$.



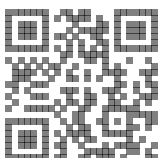
4. (a) Evaluate $(5\frac{4}{9})^{-\frac{1}{2}}$ [2]

(b) Find the value of x such that [4]

$$\frac{1+x}{x} = \sqrt{3},$$

giving your answer in the form $a + b\sqrt{3}$ where a and b are rational.

Total: 6



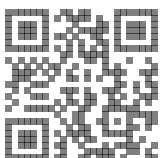
5. Given that

$$y = x + 5 + \frac{3}{\sqrt{x}},$$

(a) find $\frac{dy}{dx}$, [3]

(b) find $\int y \, dx$. [4]

Total: 7



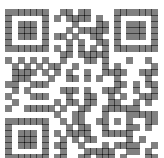
6.

$$f(x) = x^{\frac{3}{2}} - 8x^{-\frac{1}{2}}$$

(a) Evaluate $f(3)$, giving your answer in its simplest form with a rational denominator. [3]

(b) Solve the equation $f(x) = 0$, giving your answers in the form $k\sqrt{2}$. [4]

Total: 7



7. The straight line l_1 has gradient 2 and passes through the point with coordinates $(4, -5)$.

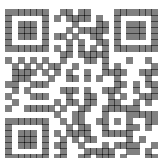
(a) Find an equation for l_1 in the form $y = mx + c$. [2]

The straight line l_2 is perpendicular to the line with equation $3x - y = 4$ and passes through the point with coordinates $(3, 0)$.

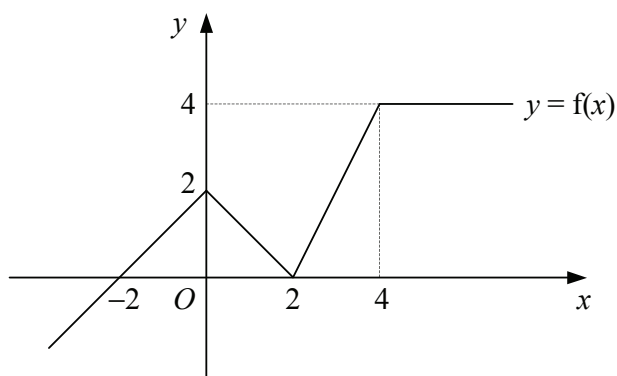
(b) Find an equation for l_2 . [3]

(c) Find the coordinates of the point where l_1 and l_2 intersect. [3]

Total: 8

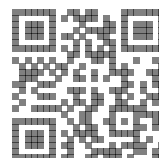


8. Figure shows the graph of $y = f(x)$.



- (a) Write down the number of solutions that exist for the equation [2]
- $f(x) = 1$,
 - $f(x) = -x$.
- (b) Labelling the axes in a similar way, sketch on separate diagrams the graphs of [6]
- $y = f(x - 2)$,
 - $y = f(2x)$

Total: 8



9. (a) Prove that the sum of the first n terms of an arithmetic series with first term a and common difference d is given by [4]

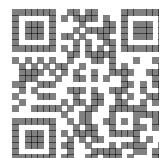
$$\frac{1}{2}n[2a + (n - 1)d].$$

A novelist begins writing a new book. She plans to write 16 pages during the first week, 18 during the second and so on, with the number of pages increasing by 2 each week.

Find, according to her plan,

- (b) how many pages she will write in the fifth week, [2]
- (c) the total number of pages she will write in the first five weeks. [2]
- (d) Using algebra, find how long it will take her to write the book if it has 250 pages. [4]

Total: 12



10. The curve C has the equation $y = f(x)$ where

$$f(x) = (x + 2)^3.$$

(a) Sketch the curve C , showing the coordinates of any points of intersection with the coordinate axes. [3]

(b) Find $f'(x)$. [4]

The straight line l is the tangent to C at the point $P(-1, 1)$.

(c) Find an equation for l . [3]

The straight line m is parallel to l and is also a tangent to C .

(d) Show that m has the equation $y = 3x + 8$. [4]

Total: 14

