

Solomon Practice Paper

Core Mathematics 2A

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

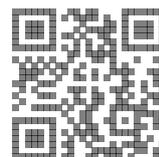
Question	Points	Score
1	5	
2	5	
3	6	
4	7	
5	7	
6	10	
7	11	
8	11	
9	13	
Total:	75	

How I can achieve better:

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Last updated: May 5, 2023



1.

$$f(x) = 3x^3 - 2x^2 + kx + 9.$$

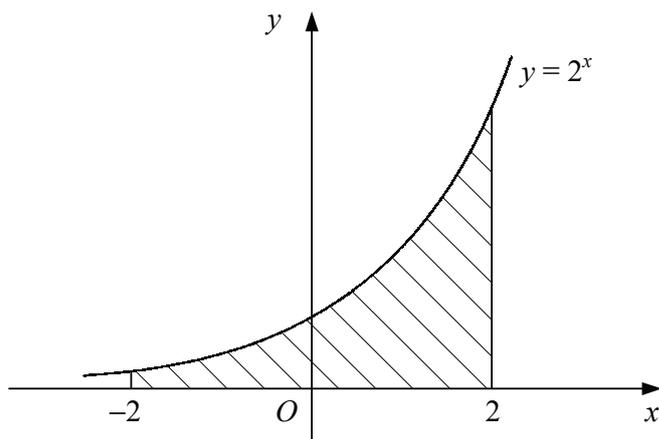
Given that when $f(x)$ is divided by $(x + 2)$ there is a remainder of -35 ,

(a) find the value of the constant k , [2]

(b) find the remainder when $f(x)$ is divided by $(3x - 2)$. [3]

Total: 5

2. Figure shows the curve with equation $y = 2^x$. [5]



Use the trapezium rule with four intervals of equal width to estimate the area of the shaded region bounded by the curve, the x -axis and the lines $x = -2$ and $x = 2$.

3. Giving your answers in terms of π , solve the equation [6]

$$3 \tan^2(\theta) - 1 = 0,$$

for θ in the interval $-\pi \leq \theta \leq \pi$.

4. (a) Expand $(1 + 3x)^8$ in ascending powers of x up to and including the term in x^3 . [4]

You should simplify each coefficient in your expansion.

(b) Use your series, together with a suitable value of x which you should state, to estimate the value of $(1.003)^8$, giving your answer to 8 significant figures. [3]

Total: 7

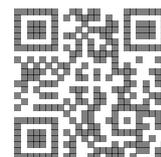
5. (a) Given that $t = \log_3(x)$, find expressions in terms of t for [4]

i. $\log_3(x^2)$,

ii. $\log_9(x)$.

(b) Hence, or otherwise, find to 3 significant figures the value of x such that [3]

$$\log_3(x^2) - \log_9(x) = 4.$$



Total: 7

6. The circle C has centre $(-3, 2)$ and passes through the point $(2, 1)$.

(a) Find an equation for C . [4]

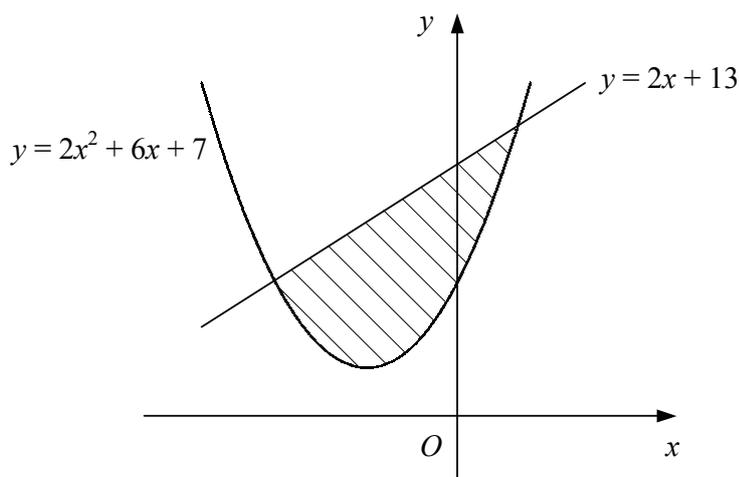
(b) Show that the point with coordinates $(-4, 7)$ lies on C . [1]

(c) Find an equation for the tangent to C at the point $(-4, 7)$. [5]

Give your answer in the form $ax + by + c = 0$, where a, b and c are integers.

Total: 10

7. Figure shows the curve $y = 2x^2 + 6x + 7$ and the straight line $y = 2x + 13$.



(a) Find the coordinates of the points where the curve and line intersect. [4]

(b) Find the area of the shaded region bounded by the curve and line. [7]

Total: 11

8. A geometric series has first term a and common ratio r where $r > 1$.

The sum of the first n terms of the series is denoted by S_n .

Given that $S_4 = 10 \times S_2$,

(a) find the value of r . [6]

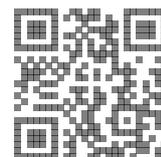
Given also that $S_3 = 26$,

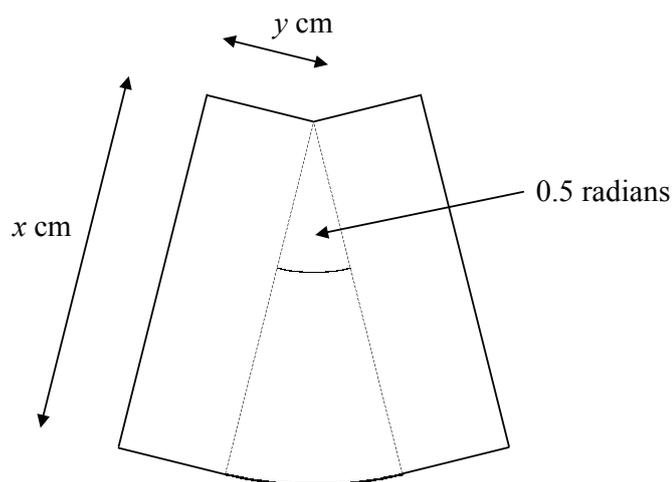
(b) find the value of a , [3]

(c) show that $S_6 = 728$. [2]

Total: 11

9. Figure shows a design consisting of two rectangles measuring x cm by y cm joined to a circular sector of radius x cm and angle 0.5 radians.





Given that the area of the design is 50 cm^2 ,

- (a) show that the perimeter, P cm, of the design is given by [5]

$$P = 2x + \frac{100}{x}.$$

- (b) Find the value of x for which P is a minimum. [4]
 (c) Show that P is a minimum for this value of x . [2]
 (d) Find the minimum value of P in the form $k\sqrt{2}$. [2]

Total: 13

