

# Solomon Practice Paper

## Core Mathematics 1F

Time allowed: 90 minutes

Centre: [www.CasperYC.club](http://www.CasperYC.club)

Name:

Teacher:

| Question | Points | Score |
|----------|--------|-------|
| 1        | 3      |       |
| 2        | 3      |       |
| 3        | 4      |       |
| 4        | 5      |       |
| 5        | 6      |       |
| 6        | 8      |       |
| 7        | 10     |       |
| 8        | 11     |       |
| 9        | 12     |       |
| 10       | 13     |       |
| Total:   | 75     |       |

How I can achieve better:

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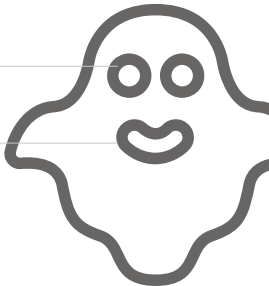
Last updated: July 14, 2025



1. Find in exact form the real solutions of the equation

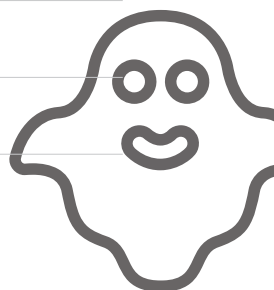
[3]

$x^4 = 5x^2 + 14.$



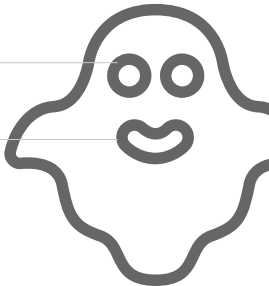
[3]

in the form  $a + b\sqrt{5}$  where  $a$  and  $b$  are rational.

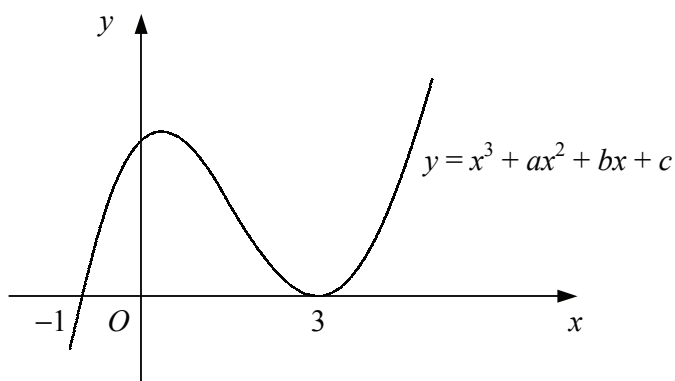


3. (a) Solve the equation  $x^{\frac{3}{2}} = 27$ . [2]
- (b) Express  $(2\frac{1}{4})^{-\frac{1}{2}}$  as an exact fraction in its simplest form. [2]

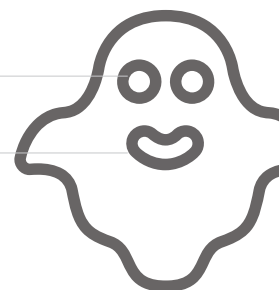
Total: 4



[5]



Show that  $a = -5$  and find the values of  $b$  and  $c$ .



5. Given that

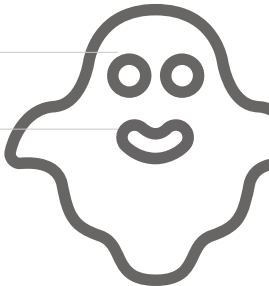
$$y = \frac{x^4 - 3}{2x^2},$$

(a) find  $\frac{dy}{dx}$ , [4]

(b) show that [2]

$$\frac{d^2y}{dx^2} = \frac{x^4 - 9}{x^4}.$$

Total: 6



6. (a) Sketch on the same diagram the curve with equation  $y = (x - 2)^2$  and the straight line with equation  $y = 2x - 1$ . [5]

Label on your sketch the coordinates of any points where each graph meets the coordinate axes.

- (b) Find the set of values of  $x$  for which [3]

$$(x - 2)^2 > 2x - 1.$$

Total: 8



$$y = \frac{x}{2} + 3 - \frac{1}{x}, x \neq 0.$$

(a) Find the gradient of the curve at  $A$ .

[4]

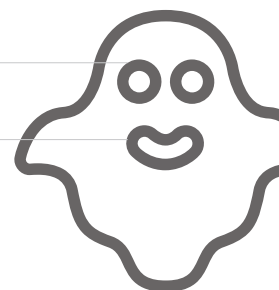
[3]

$$3x - 4y + 8 = 0.$$

(c) Find the coordinates of  $B$ .

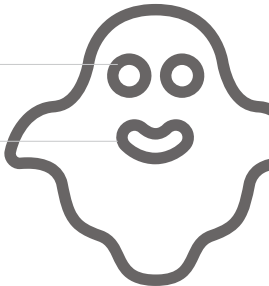
[3]

Total: 10



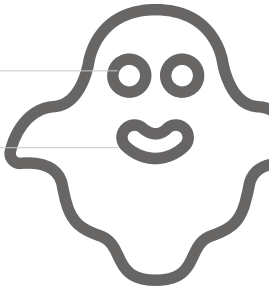
8. The straight line  $l_1$  has gradient  $\frac{3}{2}$  and passes through the point  $A(5, 3)$ .
- (a) Find an equation for  $l_1$  in the form  $y = mx + c$ . [2]
- The straight line  $l_2$  has the equation  $3x - 4y + 3 = 0$  and intersects  $l_1$  at the point  $B$ .
- (b) Find the coordinates of  $B$ . [3]
- (c) Find the coordinates of the mid-point of  $AB$ . [2]
- (d) Show that the straight line parallel to  $l_2$  which passes through the mid-point of  $AB$  also passes through the origin. [4]

Total: 11



9. The third term of an arithmetic series is  $5\frac{1}{2}$ .  
The sum of the first four terms of the series is  $22\frac{3}{4}$ .
- (a) Show that the first term of the series is  $6\frac{1}{4}$  and find the common difference. [7]
- (b) Find the number of positive terms in the series. [3]
- (c) Hence, find the greatest value of the sum of the first  $n$  terms of the series. [2]

Total: 12



Given that

$$\frac{dy}{dx} = 8x - \frac{2}{x^3}, \quad x \neq 0.$$

(a) find an equation for the tangent to  $C$  at  $P$  in the form  $y = mx + c$ , [3]

(b) find an equation for  $C$ , [5]

(c) find the  $x$ -coordinates of the points where  $C$  meets the  $x$ -axis, giving your answers in the form  $k\sqrt{2}$ . [5]

Total: 13

