

Solomon Practice Paper

Further Pure Mathematics 1B

Time allowed: 90 minutes

Centre: www.CasperYC.club

Name:

Teacher:

Question	Points	Score
1	6	
2	8	
3	9	
4	9	
5	10	
6	15	
7	18	
Total:	75	

How I can achieve better:

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7. (a) Given that $x = e^t$, find $\frac{dy}{dx}$ in terms of $\frac{dy}{dt}$ and show that [5]

$$\frac{d^2y}{dx^2} = e^{-2t} \left(\frac{d^2y}{dt^2} - \frac{dy}{dt} \right).$$

- (b) Show that the substitution $x = e^t$ transforms the differential equation [3]

$$x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} - 3y = 6x^2$$

into the differential equation

$$\frac{d^2y}{dt^2} - 2 \frac{dy}{dt} - 3y = 6e^{2t}.$$

- (c) Given that when $x = 1, y = 3$ and $\frac{dy}{dx} = -5$, solve the differential equation [10]

$$x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} - 3y = 6x^2.$$

Total: 18

