

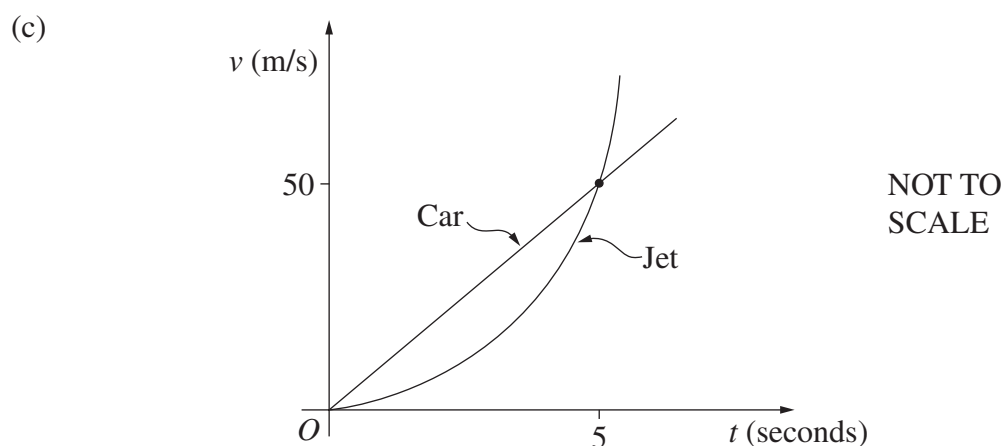
Question 9 (12 marks) Use a SEPARATE writing booklet.

- (a) Consider the function $y = \ln(x - 1)$ for $x > 1$.
- (i) Sketch the function, showing its essential features. 2
 - (ii) Use Simpson's rule with three function values to find an approximation to 2

$$\int_2^4 \ln(x - 1) dx.$$

- (b) A superannuation fund pays an interest rate of 8.75% per annum which compounds annually. Stephanie decides to invest \$5000 in the fund at the beginning of each year, commencing on 1 January 2003. 4

What will be the value of Stephanie's superannuation when she retires on 31 December 2023?



A car and a jet race one another from rest down a runway. The car increases its speed v_1 at a constant rate, while the speed of the jet is given by $v_2 = 2t^2$. After 5 seconds the car and the jet have the same speed of 50 m/s, as shown on the graph.

- (i) Find an equation for the speed v_1 of the car in terms of t . 1
- (ii) How far behind the car is the jet after 5 seconds? 2
- (iii) After how many seconds does the jet catch up with the car? 1