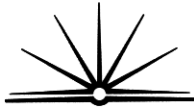


# Question 9



BOARD OF STUDIES  
NEW SOUTH WALES

$$a) y = \ln(x-1) \quad x > 1$$

i)

$$ii) A = \frac{b-a}{6} \left[ f(a) + 4f\left(\frac{a+b}{2}\right) + f(b) \right]$$

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

$$= \left[ \ln x^2 - x \right]_2^4$$

$$\left[ \ln \frac{(4)^2}{2} - 4 - \left( \ln \frac{(2)^2}{2} - 2 \right) \right]$$

$$= \left[ \ln 4 - (\ln 0) \right]$$

$$= 1.3862943614$$

b) \$5000 at 8.75% p.a. C.I for 20yrs

$$A_n = P(1+r)^n$$

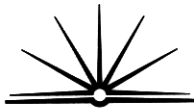
$$A_{20} = 5000(1.0875)^{20}$$

$$A_{19} = 5000(1.0875)^{19}$$

$$A_{18} = 5000(1.0875)^{18}$$

⋮

$$A_1 = 5000(1.0875)^1$$



$$\text{Total Amount} = 5000(1.0875) \left( 5000(1.0875)^{18} + 5000(1.0875)^{18} + 5000(1.0875)^{20} \right)$$

A gp. is formed.

$$S_n = \frac{a(1+r^n)}{1-r}$$

$$A_{20} = \frac{5000(1.0875) \times (1 + (1.0875)^{20})}{0.0875}$$

$$= \frac{5437.5 \times 6.352852945}{0.0875}$$

$$A_{20} = \$39460.29229$$

c) i)



C) ii) The car and the jet have equal speeds after 5 seconds, as shown on the graph.

iii) 5 seconds