BOARD OF STUDIES
NEW SOUTH WALES

Question 9

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

i)

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

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

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

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

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

$= 1.386294361\ldots$

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

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

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

$A_{19} = 5000(1.0875)^{20}$

$A_{18} = 5000(1.0875)^{20}$

$\vdots$

$A_1 = 5000(1.0875)^{20}$

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Total Amount $= 5000(1.0875)(5000(1.0875)^{18} + 5000(1.0875)^{18} + 5000(1.0875)^{20})$

A GP. is formed.

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

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

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

$$A_{20} = \$394460.29229$$

c) i)

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c) (i) The car and the jet have equal speeds after 5 seconds, as shown on the graph.

(ii) 5 seconds