$$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$$

$$f(x) = e^{-0.5x}\ (4-x)^2$$

$$F'(x) = u = e^{-0.5x} \qquad = 4 - x$$

$$F'(x) - dy/dx = v\,du/dx + u\,dv/dx$$

$$f'(x) = (4-x)(-0.5e^{-0.5x}) + e^{-0.5x}(-1)$$

$$f'(x) = 0.5e^{-0.5x}(x-4) - e^{-0.5x}$$

$$x_{n+1} = x_n - \frac{e^{-0.5x}(4-x)-2}{0.5e^{-0.5x}(x-4) - e^{-0.5x}}$$

i)	x	E_a
0	0.5	0
1	0.838890606	40.897477299
2	0.884955 9809	5.205586019
3	0.885708607 1	0.0849 744 7061
4	0.8857088 02	

$$x_{0+1} = \frac{0.5 - e^{-0.5(0.5)}(4-0.5)-2}{e^{-0.5(0.5)}(0.5-4) - e^{-0.5\times 0.5}} \Rightarrow 0.838890606$$

$$E_a \text{ to error} = \left|\frac{x_{n+1} - x_n}{x_{n+1}}\right| \times 100\%$$

$$= \left|\frac{0.838890606 - 0.5}{0.838890606}\right| \times 100 = 40.897477299$$

$$x_2 = 0.838890606 = \frac{e^{-0.5(0.838890606)}(4 - 0.838890606) - 2}{0.5e^{-0.5(0.838890606)}(0.838890606)}$$

$$= 0.884955 9807$$

$$E_a = \left|\frac{0.884955 9809 - 0.838890606}{0.884955 9809}\right| \times 100 \Rightarrow 5.205586019$$

$$x_3 = 0.884955 9809 - \frac{e^{-0.5(0.884955 9809)}(4 - 0.884955 9809) - 2}{0.5e^{-0.5(0.884955 9809)}(0.884955 9809)}$$

$$= 0.885708607 1$$

$$E_a = \left|\frac{0.885708607 1 - 0.884955 9809}{0.885708607 1}\right| \times 100 \Rightarrow 0.0849744 7061$$

$$X_4 = 0.88570860 71 - \frac{e^{-0.5(0.88570860 71)}\,(4 - 0.88570860 71) - 2}{0.5e^{-0.5(0.88570860 71)}\,(0.88570860 7 - 4) - e^{0.3(0.88570860 7)}}$$

$$= 0.88570880 2$$

$$= 2.200497495 \times 10^{-8}$$

$$X_5 = 0.88708802 - \frac{e^{-0.3(0.88708802)}\,(4 - 0.88570880 7) - 2}{0.5e^{-0.3(0.88570880 7)}\,(0.88570880 2 - 4) - e^{0.3(0.88708802}}$$

$$= 0.88570880 2$$

$$E_a = \left| \frac{0.88570880 2 - 0.88570880 2}{0.88570880 2} \right| \times 100$$

$$= 0$$