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Assignment - 1

Ans: 1

Year	Income	Semi total	semi Avg	Trend values
2008	93	158	52.67	52.67 + 10.55 = 62.11
2009	51			62.11 + 10.55 = 52.67
2010	69			52.67 + 10.55 = 63.22
2011	76	253	84.33	63.22 + 10.55 = 73.77
2012	81			73.77 + 10.55 = 84.32
2013	96			84.32 + 10.55 = 94.87

Year difference = 2012 - 2009

= 3

Semi Avg. difference = 84.32 - 52.67

= 31.65

Trend value = $\frac{31.65}{3}$

= 10.55

Ans. 2

Year	Loan	3-year semi total	3 year semi avg
2004	90	—	—
2005	92	121	40.33
2006	39	106	35.33
2007	25	91	30.33
2008	27	103	34.33
2009	51	106	35.33
2010	28	105	35
2011	26	85	28.33
2012	31	87	29
2013	30	109	36.33
2014	98	—	—

Ans. 3

The probability matrix

$$P = \begin{bmatrix} P_{00} & P_{01} \\ P_{10} & P_{11} \end{bmatrix} = \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix}$$

We need P_{00}^5 in P^5

$$P^2 = \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix} + \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix}$$

$$= \begin{bmatrix} 1.2 & 0.8 \\ 1.6 & 0.4 \end{bmatrix}$$

$$P^4 = \begin{bmatrix} 1.2 & 0.8 \\ 1.6 & 0.4 \end{bmatrix} + \begin{bmatrix} 1.2 & 0.8 \\ 1.6 & 0.4 \end{bmatrix}$$

$$= \begin{bmatrix} 2.4 & 1.6 \\ 3.2 & 0.8 \end{bmatrix}$$

$$P^5 = \begin{bmatrix} 2.4 & 1.6 \\ 3.2 & 0.8 \end{bmatrix} + \begin{bmatrix} 0.6 & 0.4 \\ 0.8 & 0.2 \end{bmatrix}$$

$$= \begin{bmatrix} 3 & 2 \\ 4 & 1 \end{bmatrix}$$

The required probability is 3.

Ans. 4

(i) more than one minute,

$$P(T>1) = e^{-\lambda t}$$
$$= e^{-2}$$
$$= 0.135$$

(ii) less than 2 minute

$$P(T<2) = 1 - e^{-\lambda t}$$
$$= 1 - e^{-4}$$
$$= 0.9816$$

(iii) between 1 to 2 minute,

$$P(1<T<2) = e^{-\lambda t_1} - e^{-\lambda t_2}$$
$$= e^{-2} - e^{-4}$$
$$= 0.1353 - 0.0133$$
$$= 0.117.$$