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Problem - 01/

Trend values using Semi-average method:

Year	Income	3-year semi-total	3-year semi-average	Trend values
2008	43			$52.66 - 10.56 = 42.1$
2009	51	158	52.66	$42.1 + 10.56 = 52.66$
2010	64			$52.66 + 10.56 = 63.22$
2011	76			$63.22 + 10.56 = 73.78$
2012	81	253	84.33	$73.78 + 10.56 = 84.34$
2013	96			$84.34 + 10.56 = 94.9$

Difference between central years $= 2012 - 2009$

$$= 3 \text{ years}$$

Difference between the semi-averages,

$$= 84.33 - 52.66$$

$$= 31.67$$

Increase in trend value for 1-year,

$$= 31.67 / 3$$

$$= 10.56$$

Problem - 02

Year	Loan	3-year semi Total	3-year semi average
2004	40	—	—
2005	42	121	40.33
2006	39	106	35.33
2007	25	91	30.33
2008	27	103	34.33
2009	51	106	35.33
2 do	28	105	35
2011	26	85	28.33
2012	31	87	29
2013	30	109	36.33
2014	48	—	—

Problem - 03

Given, Probability of,

$(9-10)$ and $(10-11)$ is 0.6

$(10-11)$ is 0.8

$\therefore$ The probability of entering customers up to 2PM to

9 AM (starting) is at Stage - 05.

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

$$\therefore P^5 = [P] \times [P] \times [P] \times [P] \times [P]$$

$$= \begin{bmatrix} 0.6665 & 0.3334 \\ 0.6668 & 0.3331 \end{bmatrix}$$

$\therefore$ The required probability is 0.6665 or 66.65%

(Ans.)

Problem - 04 :/

Given,

Poisson rate of email entering ; $\lambda = 2$ per minute

Probability of elapsed time between the entrance of
10th and 11th mail is,

(i) more then 1 minute,

$$P(T > 1) = e^{-\lambda t} = e^{-(2 \times 1)} = 0.13533$$

(ii) less than 2 minutes,

~~$P(T < 0.5)$~~

$$P(T < 2) = 1 - e^{-\lambda t} = 1 - e^{-(2 \times 2)}$$
$$= 1 - 0.01831$$
$$= 0.98169$$

(iii) between 1 to 2 minutes,

$$P(1 < T < 2) = e^{-\lambda t_1} - e^{-\lambda t_2} = e^{-(\lambda \times 1)} - e^{-(2 \times 2)}$$
$$= (0.13533 - 0.01831)$$
$$= 0.11702 \quad (Ans.)$$