

EXAM MLC QUESTIONS OF THE WEEK

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Week of April 30/07

(CAS) XYZ Insurance Company introduces a new policy and starts a sales contest for 1000 of its agents. Each makes a sale of the new product at a Poisson rate of 1 per week. Once an agent has made 4 sales, he gets paid a bonus of \$1000. The contest ends after 3 weeks. Assuming 0% interest, what is the cost of the contest?

- A) \$18,988 B) \$57,681 C) \$168,031 D) \$184,737 E) \$352,768

The solution can be found below.

Week of April 23/07 - Solution

We find the expected cost for one agent and multiply by 1000 agents.

The number of sales in 3 weeks for an agent has a Poisson distribution with mean 3 (Poisson average of 1 per week for 3 weeks). The bonus paid to an agent is either 0 (if sales are 0,1,2 or 3 in 3 weeks) or 1000 (if sales are 4 or more). The probability of an agent getting no bonus is

$$P[0,1,2 \text{ or sales in 3 weeks}] = e^{-3} + \frac{e^{-3} \cdot 3}{1!} + \frac{e^{-3} \cdot 3^2}{2!} + \frac{e^{-3} \cdot 3^3}{3!} = .647232 .$$

The probability of an agent getting a bonus is $1 - .647232 = .352768$.

The expected bonus for an agent is $1000(.352768) = 352.768$.

The expected bonus for 1000 agents is 352,768 . Answer: E