

76. You are given:

- (i) The annual number of claims for each policyholder follows a Poisson distribution with mean θ .
- (ii) The distribution of θ across all policyholders has probability density function:

$$f(\theta) = \theta e^{-\theta}, \theta > 0$$

- (iii) $\int_0^{\infty} \theta e^{-n\theta} d\theta = \frac{1}{n^2}$

A randomly selected policyholder is known to have had at least one claim last year.

Determine the posterior probability that this same policyholder will have at least one claim this year.

- (A) 0.70
- (B) 0.75
- (C) 0.78
- (D) 0.81
- (E) 0.86