

Question 4

An insurance company will sell a \$90,000 one-year term life insurance policy to an individual in a particular risk group for a premium of \$478.

Find the expected value to the company of a single policy if a person in this risk group has a 99.62% chance of surviving one year.

Solution

Let X be the random variable of the net gain of the company from a policy, then easy to get the *pdf* of X

$$p(x) = \begin{cases} 1 - 99.62\% = 0.38\%, & x = 478 - 90\,000 = -89\,522 \\ 99.62\%, & x = 478 \end{cases}$$

Then we have the expectation of X

$$\begin{aligned} \mathbb{E}[X] &= -89\,552p(-89\,552) + 478p(478) \\ &= -89\,522(0.38\%) + 478(99.62\%) \\ &= 136 \end{aligned}$$

Answer

$$\boxed{\mathbb{E}[X] = 136}$$