43. You are given:

(i)   The prior distribution of the parameter Θ has probability density function:

$$\pi(\theta) = \frac{1}{\theta^2}, \quad 1 < \theta < \infty$$

(ii)   Given $\Theta = \theta$, claim sizes follow a Pareto distribution with parameters $\alpha = 2$ and θ.

A claim of 3 is observed.

Calculate the posterior probability that Θ exceeds 2.

(A)   0.33

(B)   0.42

(C)   0.50

(D)   0.58

(E)   0.64

44. You are given:

(i)   Losses follow an exponential distribution with mean θ.

(ii)   A random sample of 20 losses is distributed as follows:

Loss Range	Frequency
[0, 1000]	7
(1000, 2000]	6
(2000, ∞)	7

Calculate the maximum likelihood estimate of θ.

(A)   Less than 1950

(B)   At least 1950, but less than 2100

(C)   At least 2100, but less than 2250

(D)   At least 2250, but less than 2400

(E)   At least 2400

276. For a group of policies, you are given:

(i)   Losses follow the distribution function

$$F(x) = 1 - \theta / x, \quad x > 0.$$

(ii)   A sample of 20 losses resulted in the following:

Interval	Number of Losses
(0,10]	9
(10, 25]	6
(25, ∞)	5

Calculate the maximum likelihood estimate of θ.

(A)   5.00

(B)   5.50

(C)   5.75

(D)   6.00

(E)   6.25