

# Test #11

NAME: \_\_\_\_\_

1. An insurance company sells an auto insurance policy that covers losses incurred by a policyholder, subject to a deductible of 100. Losses incurred follow an exponential distribution with mean 300. What is the 95th percentile of actual losses that exceed the deductible?

(A) 600                      (B) 700                      (C) 800                      (D) 900                      (E) 1000  
November 2001, #9

2. The owner of an automobile insures it against damage by purchasing an insurance policy with a deductible of 250. In the event that the automobile is damaged, repair costs can be modeled by a uniform random variable on the interval  $(0, 1500)$ . Determine the standard deviation of the insurance payment in the event that the automobile is damaged.

(A) 361                      (B) 403                      (C) 433                      (D) 464                      (E) 521  
November 2001 #29

3. An insurance policy is written to cover a loss,  $X$ , where  $X$  has a uniform distribution on  $[0, 1000]$ . At what level must a deductible be set in order for the expected payment to be 25% of what it would be with no deductible?

(A) 250                      (B) 375                      (C) 500                      (D) 625                      (E) 750  
May 2000 #38

4. An auto insurance company insures an automobile worth 15,000 for one year under a policy with a 1,000 deductible. During the policy year there is a 0.04 chance of partial damage to the car and 0.02 chance of a total loss of the car. If there is a partial damage to the car, the amount  $X$  of damage (in thousands) follows a distribution with density function

$$f(x) = \begin{cases} 0.5003e^{-x/2} & \text{for } 0 < x < 15 \\ 0 & \text{otherwise} \end{cases}$$

What is the expected claim payment?

(A) 320                      (B) 328                      (C) 352                      (D) 380                      (E) 540  
May 2001, #17

5. For Company A there is a 60% chance that no claim is made during the coming year. If one or more claims are made, the total claim amount is normally distributed with mean 10,000 and standard deviation 2,000. For Company B there is a 70% chance that no claim is made during the coming year. If one or more claims are made, the total claim amount is normally distributed with mean 9,000 and standard deviation 2,000. Assume that the total claim amounts of the two companies are independent. What is the probability that, in the coming year, Company B's total claim amount will exceed Company A's total claim amount?

(A) 0.180                      (B) 0.185                      (C) 0.217                      (D) 0.223                      (E) 0.240  
May 2001 #33

6. Auto claim amounts, in thousands, are modeled by a random variable with density function  $f(x) = xe^{-x}$  for  $x > 0$ . The company expects to pay 100 claims if there is no deductible. How many claims does the company expect to pay if the company decides to introduce a deductible of 1000?

(A) 26                      (B) 37                      (C) 50                      (D) 63                      (E) 74  
November 2001 #35

7. An insurance company sells a one-year automobile policy with a deductible of 2. The probability that the insured will incur a loss is 0.05. If there is a loss, the probability of a loss of amount  $N$  is  $\frac{K}{N}$ , for  $N = 1, \dots, 5$  and  $K$  a constant. These are the only possible loss amounts and no more than one loss can occur. Determine the net premium for this policy.

(A) 0.031                      (B) 0.066                      (C) 0.072                      (D) 0.110                      (E) 0.150  
November 2001, #5

8. A baseball team has scheduled its opening game for April 1. If it rains on April 1, the game is postponed and will be played on the next day that it does not rain. The team purchases insurance against rain. The policy will pay 1000 for each day, up to 2 days, that the opening game is postponed. The insurance company determines that the number of consecutive days of rain beginning on April 1 is a Poisson random variable with mean 0.6. What is the standard deviation of the amount the insurance company will have to pay?

(A) 668                      (B) 699                      (C) 775                      (D) 817                      (E) 904  
November 2001, #12

9. A family buys two policies from the same insurance company. Losses under the two policies are independent and have continuous uniform distributions on the interval from 0 to 10. One policy has a deductible of 1 and the other has a deductible of 2. The family experiences exactly one loss under each policy. Calculate the probability that the total benefit paid to the family does not exceed 5.

(A) 0.13                      (B) 0.25                      (C) 0.30                      (D) 0.32                      (E) 0.42  
May 2003, #20

10. A piece of equipment is being insured against early failure. The time from purchase until failure of the equipment is exponentially distributed with mean 10 years. The insurance will pay an amount  $x$  if the equipment fails during the first year, and it will pay  $0.5x$  if failure occurs during the second or third year. If failure occurs after the first three years, no payment will be made. At what level must  $x$  be set if the expected payment made under this insurance is to be 1000?

(A) 3858                      (B) 4449                      (C) 5382                      (D) 5644                      (E) 7235  
November 2000 #14

11. A company offers earthquake insurance. Annual premiums are modeled by an exponential random variable with mean 2. Annual claims are modeled by an exponential random variable with mean 1. Premiums and claims are independent. Let  $X$  denote the ratio of claims to premiums. What is the density function of  $X$ ?

(A)  $\frac{1}{2x+1}$                       (B)  $\frac{2}{(2x+1)^2}$                       (C)  $e^{-x}$                       (D)  $2e^{-2x}$                       (E)  $xe^{-x}$   
May 2001 #26

12. A manufacturer's annual losses follow a distribution with density function

$$f(x) = \begin{cases} \frac{2.5 (.6)^{2.5}}{x^{3.5}} & \text{for } x > 0.6 \\ 0 & \text{otherwise} \end{cases}$$

To cover its losses, the manufacturer purchases an insurance policy with an annual deductible of 2. What is the mean of the manufacturer's annual losses not paid by the insurance policy?

(A) 0.84                      (B) 0.88                      (C) 0.93                      (D) 0.95                      (E) 1.00  
November 2000, #25