

1.

You are given the following information:

- The number of wild fires per day in a state follows a Poisson distribution.
- The expected number of wild fires in a thirty-day time period is 15.

Calculate the probability that the time between the eighth and ninth fire will be greater than three days.

- A. Less than 20%
- B. At least 20%, but less than 25%
- C. At least 25%, but less than 30%
- D. At least 30%, but less than 35%
- E. At least 35%

2.

Customers enter a supermarket at a Poisson rate of 3 customers per minute. Each person spends \$50 on average but the amount spent by any one individual follows a Normal distribution with coefficient of variation, $\left(\frac{\sigma}{\mu}\right)$, of 25%. The amount spent by a customer is revenue to the supermarket.

Calculate the standard deviation of the revenue generated by customers who enter the supermarket in a single hour.

- A. Less than \$500
- B. At least \$500, but less than \$550
- C. At least \$550, but less than \$600
- D. At least \$600, but less than \$650
- E. At least \$650

EXAM 3, FALL 2006

26. Which of the following is/are true?

1. A counting process is said to possess independent increments if the number of events that occur between time s and t is independent of the number of events that occur between time s and $t+u$ for all $u>0$.
2. All Poisson processes have stationary and independent increments.
3. The assumption of stationary and independent increments is essentially equivalent to asserting that at any point in time the process probabilistically restarts itself.

- A. 1 only
- B. 2 only
- C. 3 only
- D. 1 and 2 only
- E. 2 and 3 only

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EXAM 3, FALL 2006

27. A customer service operator accepts calls continuously throughout the work day. The length of each call is exponentially distributed with an average of 3 minutes.

Calculate the probability that at least one call will be completed in the next 2 minutes.

- A. Less than 0.50
- B. At least 0.50, but less than 0.55
- C. At least 0.55, but less than 0.60
- D. At least 0.60, but less than 0.65
- E. At least 0.65

EXAM 3, FALL 2005

- 29) ABC Insurance Company estimates that the time between reported claims is exponentially distributed with mean 0.50 years. Times between claims are independent. Each time a claim is reported, a payment is made with probability 0.70.

Calculate the probability that no payment will be made on claims reported during the next two years.

- A. 0.06
- B. 0.14
- C. 0.25
- D. 0.30
- E. 0.50

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EXAM 3, FALL 2005

- 31) The Toronto Bay Leaves attempt shots in a hockey game according to a Poisson process with mean 30. Each shot is independent. For each attempted shot, the probability of scoring a goal is 0.10.

Calculate the standard deviation of the number of goals scored by the Bay Leaves in a game.

- A. Less than 1.4
- B. At least 1.4, but less than 1.6
- C. At least 1.6, but less than 1.8
- D. At least 1.8, but less than 2.0
- E. At least 2.0

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EXAM 3, SPRING 2005

7) An insurance company pays claims at a Poisson rate of 2,000 per year. Claims are divided into three categories: "minor," "major," and "severe," with payment amounts of \$1,000, \$5,000, and \$10,000, respectively. The proportion of "minor" claims is 50%. The total expected claim payments per year is \$7,000,000.

What proportion of claims are "severe"?

- A. Less than 11%
- B. At least 11%, but less than 12%
- C. At least 12%, but less than 13%
- D. At least 13%, but less than 14%
- E. 14% or more

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EXAM 3, SPRING 2005

11) For Broward County, Florida, hurricane season is 24 weeks long. It is assumed that the time between hurricanes is exponentially distributed with a mean of 6 weeks.

It is also assumed that 30% of all hurricanes will hit Broward County.

Calculate the probability that in any given hurricane season, Broward County will be hit by more than 1 hurricane.

- A. Less than 15%
- B. At least 15%, but less than 20%
- C. At least 20%, but less than 25%
- D. At least 25%, but less than 30%
- E. 30% or more

EXAM 3, SPRING 2005

17) An insurer selects risks from a population that consists of three independent groups.

- The claims generation process for each group is Poisson.
- The first group consists of 50% of the population. These individuals are expected to generate one claim per year.
- The second group consists of 35% of the population. These individuals are expected to generate two claims per year.
- Individuals in the third group are expected to generate three claims per year.

A certain insured has two claims in year 1.

What is the probability that this insured has more than two claims in year 2?

- A. Less than 21%
- B. At least 21%, but less than 25%
- C. At least 25%, but less than 29%
- D. At least 29%, but less than 33%
- E. 33% or more

EXAM 3, FALL 2004

17. You are given:

- Claims are reported at a Poisson rate of 5 per year.
- The probability that a claim will settle for less than \$100,000 is 0.9.

What is the probability that no claim of \$100,000 or more is reported during the next 3 years?

- A. 20.59%
- B. 22.31%
- C. 59.06%
- D. 60.65%
- E. 74.08%

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EXAM 3, SPRING 2004

31. Coins are tossed into a fountain according to a Poisson process with a rate of one every three minutes. The coin denominations are independently distributed as follows:

<u>Coin Denomination</u>	<u>Probability</u>
Penny	0.5
Nickel	0.2
Dime	0.2
Quarter	0.1

Calculate the probability that the fourth dime is tossed into the fountain in the first two hours.

- A. Less than 0.89
- B. At least 0.89, but less than 0.92
- C. At least 0.92, but less than 0.95
- D. At least 0.95, but less than 0.98
- E. At least 0.98

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EXAM 3, FALL 2003

13) The Allerton Insurance Company insures 3 indistinguishable populations. The claims frequency of each insured follows a Poisson process.

Given:

Population (class)	Expected time between claims	Probability of being in class	Claim cost
I	12 months	1/3	1,000
II	15 months	1/3	1,000
III	18 months	1/3	1,000

Calculate the expected loss in year 2 for an insured that had no claims in year 1.

- A. Less than 810
- B. At least 810, but less than 910
- C. At least 910, but less than 1,010
- D. At least 1,010, but less than 1,110
- E. At least 1,110

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EXAM 3, FALL 2003

31) Vehicles arrive at the Bun-and-Run drive-thru at a Poisson rate of 20 per hour. On average, 30% of these vehicles are trucks.

Calculate the probability that at least 3 trucks arrive between noon and 1:00 PM.

- A. Less than 0.80
- B. At least 0.80, but less than 0.85
- C. At least 0.85, but less than 0.90
- D. At least 0.90, but less than 0.95
- E. At least 0.95

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