

287. For an aggregate loss distribution S :

- (i) The number of claims has a negative binomial distribution with $r = 16$ and $\beta = 6$.
- (ii) The claim amounts are uniformly distributed on the interval $(0, 8)$.
- (iii) The number of claims and claim amounts are mutually independent.

Using the normal approximation for aggregate losses, calculate the premium such that the probability that aggregate losses will exceed the premium is 5%.

- (A) 500
- (B) 520
- (C) 540
- (D) 560
- (E) 580

288. The random variable N has a mixed distribution:

- (i) With probability p , N has a binomial distribution with $q = 0.5$ and $m = 2$.
- (ii) With probability $1 - p$, N has a binomial distribution with $q = 0.5$ and $m = 4$.

Which of the following is a correct expression for $\Pr(N = 2)$?

- (A) $0.125p^2$
- (B) $0.375 + 0.125p$
- (C) $0.375 + 0.125p^2$
- (D) $0.375 - 0.125p^2$
- (E) $0.375 - 0.125p$

14. In modeling the number of claims filed by an individual under an automobile policy during a three-year period, an actuary makes the simplifying assumption that for all integers $n \geq 0$, $p(n+1) = 0.2p(n)$ where $p(n)$ represents the probability that the policyholder files n claims during the period.

Under this assumption, calculate the probability that a policyholder files more than one claim during the period.

- (A) 0.04
 - (B) 0.16
 - (C) 0.20
 - (D) 0.80
 - (E) 0.96
15. An insurer offers a health plan to the employees of a large company. As part of this plan, the individual employees may choose exactly two of the supplementary coverages A, B, and C, or they may choose no supplementary coverage. The proportions of the company's employees that choose coverages A, B, and C are $1/4$, $1/3$, and $5/12$ respectively.

Calculate the probability that a randomly chosen employee will choose no supplementary coverage.

- (A) 0
 - (B) $47/144$
 - (C) $1/2$
 - (D) $97/144$
 - (E) $7/9$
16. An insurance company determines that N , the number of claims received in a week, is a random variable with $P[N = n] = \frac{1}{2^{n+1}}$ where $n \geq 0$. The company also determines that the number of claims received in a given week is independent of the number of claims received in any other week.

Calculate the probability that exactly seven claims will be received during a given two-week period.

- (A) $1/256$
- (B) $1/128$
- (C) $7/512$
- (D) $1/64$
- (E) $1/32$

- 93.** At the beginning of each round of a game of chance the player pays 12.5. The player then rolls one die with outcome N . The player then rolls N dice and wins an amount equal to the total of the numbers showing on the N dice. All dice have 6 sides and are fair.

Using the normal approximation, calculate the probability that a player starting with 15,000 will have at least 15,000 after 1000 rounds.

- (A) 0.01
- (B) 0.04
- (C) 0.06
- (D) 0.09
- (E) 0.12

- 94.** X is a discrete random variable with a probability function that is a member of the $(a, b, 0)$ class of distributions.

You are given:

- (i) $\Pr(X = 0) = \Pr(X = 1) = 0.25$
- (ii) $\Pr(X = 2) = 0.1875$

Calculate $\Pr(X = 3)$.

- (A) 0.120
- (B) 0.125
- (C) 0.130
- (D) 0.135
- (E) 0.140