QUESTION 1

1. The random loss variable X has the following distribution $f(x) = 0.1e^{-0.1x}$, 0<x. Payments are subject to deductible d, where 0<d<1. The probability that a claim is less than 5 is 0.75. Calculate d.

- 5.43
- 7.01
- 9.93
- 11.39
- 8.86

1 points

QUESTION 2

1. For an insurance:

- Losses Y can be 150, 200, 300 and 350 with the probabilities 0.1, 0.3, 0.2, 0.4.
- The insurance has ordinary deductible 200.
  Calculate $Var(Y^L)$.

- 4800
- 4600
- 4200
- 4400
- 4000

1 points

QUESTION 3

1. You are given:

- The lognormal distribution with parameters $\mu = 10$ and $\sigma^2=5$ is a good fit to 2020 liability claims.
- The inflation is constant 10% per year.

Determine the insurer's 2021 net claim amount for a single claim after application of 1,000,000 reinsurance cap.

- 107,520
- 111,209
- 168,771
- 155,603
- 131,785

1 points

QUESTION 4

1. For an aggrerate losses model, the number losses has a Poisson distribution with λ=40. For individual losses, you are given:

- The mean excess loss function, e(30) = 60
- P(X>30) = 0.75
- $E[X^2 |X>30] = 9000$.
- There is an ordinary deductible of 30 per loss.

Calculate the variance of aggregate payments of the insurance.

- 87,500
- 175,500
- 105,000
- 67,500
- 135,000

1 points

QUESTION 5

1. The number of claims follows Poisson distribution with mean 10. P(X=1) = 0.2, P(X=2) = 0.2, P(X = 3) = 0.6. Calculate the variance of aggregate losses.

- 64
- 84
- 40
- 70
- 36

1 points

QUESTION 6

1. For an individual over 65:

- The number of pharmacy claims has uniform distribution on the integers 1 through 5.
- The amount of each pharmacy claim has Poisson distribution with mean 30.

Determine the probability that aggregate claims for this individual will exceed 200 using normal distribution.

- 1-φ(1.68)
- 1-φ(0.68)
- 1-φ(2.52)
- 1-φ(0.52)
- 1-φ(2.13)

1 points

QUESTION 7

1. For an aggregate loss distribution S:

- The number of claims has negative binomial distribution with r = 16 and λ = 6.
- The claim amounts are uniformly distributed on the interval (0,8).
- Number of claims and claim amounts are mutually independent.

Using the normal approximation, calculate the premium such that the probability that aggregate losses will exceed the premium by 10%.

- 540
- 580
- 520
- 500

- 560

1 points

QUESTION 8

1. For a stop-loss insurance losses follow Poisson distribution with mean 2. The amount of loss is 1,2 and 3 with probabilities 0.2, 0.2, 0.6, respectively. Loss amount is independent of number of losses. The stop-loss insurance has a deductible of 2.

   Calculate the net stop-loss premium.

   - 3.00
   - 3.35
   - 3.15
   - 3.42
   - 3.23

1 points

QUESTION 9

1. The aggregate losses S has a frequency with geometric distribution with mean 4, the amount of each loss is 40. Calculate net stop-loss premium with deductible 90.

   - 102
   - 87
   - 97
   - 107
   - 92

1 points

QUESTION 10

1. In an aggregate model frequency has negative binomial distribution with $\beta = 3$ and $r = 2$. Severity has Poisson distribution with mean λ. Probability of no claims is 0.1. Calculate λ.

   - 2.5
   - 3.1
   - 1.3
   - 2.1
   - 0.8

1 points

QUESTION 11

1. Aggregate claims S has a compound Poisson distribution with individual claim amount distribution: $\Pr(X=1) = 1/3$ and $\Pr(X=2) = 2/3$.

   $2\Pr(S=4) = \Pr(S = 3) + 6 \Pr(S = 1)$.

   Determine E[S].

- 10
- 8
- 20
- 16
- 12

1 points

QUESTION 12

1. You are given:

- Losses follow lognormal distribution with parameters $\mu = 10$ and $\sigma = 1$.
- One loss is expected each year.
- Losses have franchise deductible 50,000 and policy limit of 120,000.

Calculate expected annual payment of the insurer.

- 11,334
- 15,603
- 9,598
- 17,311
- 16,224

1 points

QUESTION 13

1. For an insurance:

- The number losses per year has a Poisson distribution with mean 10.
- Loss amount follow Pareto distribution with $\theta = 10$ and $\alpha = 2.5$.
- The insurance for the losses has ordinary deductible 10 per loss.

Calculate the expected value of aggregate payments.

- 29
- 8
- 18
- 24
- 13

1 points

QUESTION 14

1. For an insurance:

- Number of losses has the following distribution: Pr(N=0) = 0.7, Pr(N=1) = 0.2 and Pr(N=2) = 0.1.
- Loss amount follows exponential distribution with mean 1200.
- An each loss is subject to an ordinary deductible of 500.

Calculate the probability that aggregate claims are greater than 200, using normal approximation.

- 0.58
- 0.61

- 0.55
- 0.51
- 0.64

1 points

QUESTION 15

1. The frequency follows binary distribution with m = 3, q = 1/6.

   Severity follows the following distribution:

   Pr(X=100) = 2/3

   Pr(X = 1100) =1/6

   Pr(X=2100)=1/6

   Calculate the variance of the aggregate loss distribution.

   - 448,961
   - 422,524
   - 483,301
   - 441,666
   - 510,889