

Name:

MATH 320: Homework 13

Due _____ : Turn in a hard copy, neat and stapled.

1. Assume the amount of a single loss for an insurance policy has the density function $f(x) = 0.05e^{-0.05x}$, for $x > 0$.
 - (a) Suppose this policy has a \$5 per claim deductible. Find the expected amount of a single claim for this policy.
 - (b) Now suppose there is a payment cap of \$30 (and no deductible). Find the expected amount of a single claim for this policy.
2. An insurance policy is written to cover a loss, X , where $X \sim \text{Uniform}(a = 0, b = 1000)$.

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?
3. A device that continuously measures and records seismic activity is placed in a remote region. The time, T , to failure of this device is uniformly distributed on the interval $[0, 80]$ years.

Since the device will not be monitored during its first 10 years of service, the time to discovery of its failure is $X = \max(T, 10)$ (i.e. whichever X takes the value of whichever is greater for that particular x point).

 - (a) Write X as a piecewise function of T .
 - (b) Find $E(X)$.
4. Let $X \sim \text{Exponential}(\lambda = 0.5)$ and $Y = 1/X$. Assume $x > 0$ for this problem.
 - (a) Find $F_Y(y)$.
 - (b) Find $f_Y(y)$.
 - (c) Find $P(1 \leq Y \leq 2)$.
5. An investment account earns an annual interest rate R that follows a uniform distribution on the interval $(0.05, 0.08)$. The value of a 10,000 initial investment in this account after one year is given by $V = 10,000e^R$.
 - (a) Find $F_V(v)$.
 - (b) Find $P(V \geq 10,500)$.

Select answers

1. (a) Exp value = 15.576
(b) Exp value = 15.537
2. $d = 500$
3. (a)
(b) $E(X) = 40.625$
4. (a)
(b)
(c) Prob ≈ 0.1723
5. (a)
(b) Prob ≈ 0.7802