

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.  $X$  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  $P(V \geq 10,700)$ .

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  $\approx 0.1723$
5. (a)  
(b) Prob  $\approx 0.5886$