

Stat 98/198 – Spring 09 – Exam P DeCal – HW #1  
Due 2/17

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.

Determine 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

38. An insurance company insures a large number of homes. The insured value,  $X$ , of a randomly selected home is assumed to follow a distribution with density function

$$f(x) = \begin{cases} 3x^{-4} & \text{for } x > 1 \\ 0 & \text{otherwise.} \end{cases}$$

Given that a randomly selected home is insured for at least 1.5, what is the probability that it is insured for less than 2 ?

(A) 0.578 (B) 0.684 (C) 0.704 (D) 0.829 (E) 0.875

39. A company prices its hurricane insurance using the following assumptions:

- (i) In any calendar year, there can be at most one hurricane.
- (ii) In any calendar year, the probability of a hurricane is 0.05 .
- (iii) The number of hurricanes in any calendar year is independent of the number of hurricanes in any other calendar year.

Using the company's assumptions, calculate the probability that there are fewer than 3 hurricanes in a 20-year period.

(A) 0.06 (B) 0.19 (C) 0.38 (D) 0.62 (E) 0.92

53. An insurance policy reimburses a loss up to a benefit limit of 10. The policyholder's loss,  $Y$ , follows a distribution with density function:

$$f(y) = \begin{cases} \frac{2}{y^3} & \text{for } y > 1 \\ 0, & \text{otherwise.} \end{cases}$$

What is the expected value of the benefit paid under the insurance policy?

- (A) 1.0 (B) 1.3 (C) 1.8 (D) 1.9 (E) 2.0

66. A company agrees to accept the highest of four sealed bids on a property. The four bids are regarded as four independent random variables with common cumulative distribution function

$$F(x) = \frac{1}{2}(1 + \sin \pi x) \quad \text{for } \frac{3}{2} \leq x \leq \frac{5}{2}.$$

Which of the following represents the expected value of the accepted bid?

- (A)  $\pi \int_{3/2}^{5/2} x \cos \pi x \, dx$
- (B)  $\frac{1}{16} \int_{3/2}^{5/2} (1 + \sin \pi x)^4 \, dx$
- (C)  $\frac{1}{16} \int_{3/2}^{5/2} x(1 + \sin \pi x)^4 \, dx$
- (D)  $\frac{1}{4} \pi \int_{3/2}^{5/2} \cos \pi x (1 + \sin \pi x)^3 \, dx$
- (E)  $\frac{1}{4} \pi \int_{3/2}^{5/2} x \cos \pi x (1 + \sin \pi x)^3 \, dx$