## STA2001 Tutorial 11

1. 5.3-7 The distributions of incomes in two cities follow the two Pareto-type pdfs

$$f(x) = \frac{2}{x^3}$$
,  $1 < x < \infty$ , and  $g(y) = \frac{3}{y^4}$ ,  $1 < y < \infty$ ,

respectively (Suppose that X and Y are independent). Here one unit represents \$20,000. One person with income is selected at random from each city. Let X and Y be their respective incomes. Compute P(X < Y).

2. 5.3-8 Suppose two independent claims are made on two insured homes, where each claim has pdf

$$f(x) = \frac{4}{x^5}, \quad 1 < x < \infty,$$

in which the unit is \$1000. Find the expected value of the larger claim.

Hint: If  $X_1$  and  $X_2$  are the two identical and independent claims and  $Y = \max(X_1, X_2)$ , then

$$G(y) = P(Y \le y) = P(X_1 < y)P(X_2 < y) = [P(X \le y)]^2.$$

Find g(y) = G'(y) and E(Y).

| 3. | 5.3-20. Let $X$ and $Y$ the correlation coefficient of $X$ and $Y$ . | - |  |  |
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- 4. The number of people who enter an elevator on the ground floor, denoted as X, is a Poisson random variable with mean  $\lambda$ . If there are N floors above the ground floor, and if each person is equally likely to get off at any one of the N floors, independently of where the others get off, compute the expected number of stops that the elevator will make in order to discharge all of its passengers.
  - Poisson pmf:  $p_X(n) = \frac{e^{-\lambda}\lambda^n}{n!}, n \ge 0$   $\sum_{n=0}^{\infty} \frac{x^n}{n!} = e^x$