INTRODUCTORY MATHEMATICAL STATISTICS (STAT2001/6039)

Tutorial 6

Problem 1

n dice are to be rolled.

Let *Y* be the largest number which comes up.

(a) Determine *Y*'s cdf (cumulative distribution function).
Write down and sketch this function for the case $n = 2$.

(b) If two dice are to be rolled, what is the probability that the largest of the numbers to come up will be 3?

(c) Determine *Y*'s pdf (probability density function).
Write down and sketch this function for the case $n = 2$.

Problem 2

A continuous random variable *Y* has pdf given by

$$f(y) = ky(1-y), \quad 0 < y < 1.$$

(a) Find *k* and sketch *Y*'s pdf.

(b) Determine *Y*'s cdf and sketch it.

(c) Find $P(0.4 < Y < 0.5)$.

(d) Find $P(0.4 < Y \mid Y < 0.5)$.

Problem 3

A continuous random variable *Y* has cdf given by

$$F(y) = c - ke^{-3y}, \quad y \geq 2 .$$

(a) Determine the constants *c* and *k*.
Then sketch the cdf.

(b) Find *Y*'s pdf and sketch it.

Problem 4

A pole of length 10m is to be broken at a point chosen randomly along it.

The part of the pole to the left of the breakpoint will then be split ***lengthwise*** into four and a square frame constructed from the four resulting thin sticks.

Let *Y* be the area of this square frame.

(a) Determine *Y*'s cdf and sketch it. (*Hint:* Find $P(Y < 4)$ and $P(Y < 9)$.)

(b) Determine *Y*'s pdf and sketch it.

(c) Find *Y*'s mode and median.