

MATH 2F81 FIRST MIDTERM OCTOBER 15, 2007

Full credit given for 3 correct and complete answers (out of 5)

One sheet of notes and a Maple workspace allowed

Duration: 1 hour

1. When 13 dice are rolled, what is the probability of getting (exactly) two quadruplets?

2. When

$$(1 + 3x^2 - 4x^3)^{1000}$$

is fully expanded, what is the coefficient of x^{17} (give details of your computation).

3. Assuming A , B , C and D to be mutually independent, and $\Pr(A) = 0.47$, $\Pr(B) = 0.21$, $\Pr(C) = 0.83$, $\Pr(D) = 0.55$, find

$$\Pr[(A \cap \bar{B}) \cup (C \cap \bar{D}) \cup (A \cap \bar{C}) \cup (B \cap \bar{D})]$$

4. Four players are dealt 8 cards each from a well shuffled deck of 52 cards. What is the probability that the first and third players (partners, in this game), receive exactly 3 aces between them (e.g. the first player gets 2 aces and the third player gets 1, or the first player gets no ace and the second one gets 3, etc.)?

5. Given that

$$\begin{aligned} P(A) &= 0.31, & P(B) &= 0.33, & P(C) &= 0.37 \\ P(A \cap B) &= 0.11, & P(A \cap C) &= 0.13, & P(B \cap C) &= 0.12 \\ && \text{and } P(A \cap B \cap C) &= 0.05 \end{aligned}$$

find

$$\Pr [(A \cup \bar{B} \cup \bar{C}) \cap (\bar{A} \cup B \cup C) \cap (A \cup \bar{B} \cup C)]$$

Hint: Compute the probability of the complement first.