

Full credit given for 3 correct and complete answers.

Four significant digits required for numerical answers, e.g. 0.0005824

One sheet of notes and a Maple workspace allowed. Duration: 50 min.

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1. Four friends and 16 other boys are randomly divided into four teams of 5 boys each. What is the probability that (any) 3 of these friends (but not all four) will end up playing for the same team.

2. When 13 dice are rolled, what is the probability of getting (exactly) 3 triplets?

3. List all terms of the multinomial expansion of

$$(0.93 + 3x - 3y^2 - x^2y)^{1000}$$

which can be reduced to  $c \cdot x^8y^8$  (where  $c$  is a number) and then find their total.

4. Given that

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

find

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

Hint: Find the probability of the complement first - partial mark given for correctly finding the complement.

5. An eight-card hand is dealt from a well shuffled deck of 52 cards. What is the probability of getting:
- exactly 2 queens,
  - exactly 4 clubs,
  - exactly 2 queens and 4 clubs?