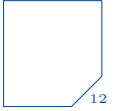




FORENAME:

SURNAME:

STUDENT NO:



2019–20

MATH117 Mathematics for Architects – Homework 5

N. Course

DEADLINE: Friday 29 November 2019, 4:50pm

You must explain your answers to the following problems.

Exercise 21 (Basketball). A basketball team has 5 distinct positions. Out of 8 players, how many starting teams are possible if:

(a). The distinct positions are taken into consideration?

(b). The distinct positions are not taken into consideration?

(c). The distinct positions are not taken into consideration, but either Candide or Deniz (but not both) must start?

[A standard deck of playing cards contains 52 cards, with 13 hearts (♥), 13 clubs (♣), 13 diamonds (♦) and 13 spades (♠). Hearts and diamonds are called “red cards”. Clubs and spades are called “black cards”. Kings (K), queens (Q) and jacks (J) are called “face cards”.]

Exercise 22 (Playing Cards). From a standard deck of 52 playing cards:

(a). How many 6-card hands consist entirely of hearts (♥)?

(b). How many 5-card hands consist entirely of face cards?

(c). How many 5-card hands consist entirely of queens?

Exercise 23 (Playing Cards). From a standard deck of 52 playing cards, a hand of n cards is dealt randomly. Which of the following has a higher probability of occurring?

(i). a 5-card hand consists of only face cards.

(ii). a 13-card hand has only black cards.

Exercise 24 (Union and Intersection).

(a). You roll a die which has been “loaded” so that $P(1) = \frac{1}{12}$, $P(2) = P(3) = P(4) = P(5) = \frac{1}{6}$ and $P(6) = \frac{3}{12}$. Find the probability that the number rolled is both even and greater than two.

(b). In the Architecture department: 63% of students like their Basic Design teacher, 34% of students like their Mathematics teacher, and 27% like both of these teachers. What is the percentage of students who like at least one of these teachers?

Exercise 25 (Complements). From a standard deck of 52 playing cards, what is the probability of:

(a). getting at least one diamond ($\heartsuit$) in a 5-card hand?

(b). getting at least one black card in a 13-card hand?