**XJCO1511: Introduction to Discrete Mathematics**
**2023/24**
**Coursework 1**
**Released: Monday, March 11, 2024, at 8 a.m.**
**Due: Friday, March 22, by 5 p.m.**

1. In how many ways can a photographer at a wedding arrange 5 people in a row from a group of 10 people (that includes the bride and the groom), subject to the following constraints.

(a) [4 marks] Both the bride and the groom must be in the picture.

(b) [4 marks] Bride must be next to the groom.

2. [4 marks] How many ways are there to seat 10 people around a circular table where two seatings are considered to be the same when everyone has the same immediate left and immediate right neighbor.

3. [4 marks] In a standard deck of cards there are 4 suits: clubs, diamonds, hearts and spades. Each suit contains 13 cards: 2, 3,..., 10, Jack, Queen, King, Ace. So there are $4 \cdot 13 = 52$ cards in the deck. In the game of poker a player receives a subset of 5 cards, called a poker hand, from the standard deck of 52 cards. The order in which the cards are received is not important, just the actual cards themselves. How many poker hands do not contain a King or contain exactly one suit?