Expectation

Just one exercise for the last lecture. A sample solution will be posted on Sunday.

**Exercise 1.** You randomly draw one card at a time from a deck of 52 Poker cards:

\[
\{A, 2-10, J, Q, K\} \times \{\spadesuit, \heartsuit, \diamondsuit, \clubsuit\}
\]

The cards are *not* put back into the deck after each drawing.

(a) Is the event of drawing a specific card independent of the previous draw?

(b) Calculate the expected number of drawing attempts until a card *other than* an ace is drawn.

(c) Calculate the expected number of drawing attempts until the sum of the cards drawn is ≥ 5.
   (2-10 are counted as their numeric value; J, Q, K are counted as 10; A is counted as 11).

(d) Answer questions (a)–(c) for the case when the cards *are* put back after each drawing.

(e) Calculate the variance for the two random variables considered in question (b).

Congratulations on reaching the end of this course!