

1. Cars and trucks arrive at a gas station randomly and independently of each other, at an average rate of 17.4 and 9.6 per hour, respectively. Use the Poisson distribution to find the probability that
 - (a) more than 5 *cars* arrive during the next 16 minutes,
 - (b) we have to wait more than 21 minutes for the arrival of the third *truck* (from now),
 - (c) the fifth *vehicle* will take between 17 and 23 minutes (from now) to arrive.
2. Repeat Q2 of Assignment 1 assuming that the 3 players are dealt (one after another) 7 cards each from the *same* well-shuffled deck of 52 cards.
3. Consider playing a game having the following pay off table (the values of X are in dollars)

$X =$	-2	0	1	3
Pr	0.28	0.35	0.24	0.13

- independently 237 times. Using the Central Limit Theorem (with continuity correction), approximate the probability of winning (net total) more than \$25. Compare with the exact answer (hint: find the PGF of a single X , raise it to the power of 237 and expand).
4. Five cards are dealt from a deck of 51 cards (a crooked dealer has removed the ace of spades from it) and we get paid \$1 for each ace, but have to pay a quarter for each diamond (for the ace of diamonds, this works out to \$0.75 net). Using the Normal approximation (a.k.a. Central Limit Theorem), estimate the probability of losing (net total) more than \$3.50 in 200 independent rounds of this game. Compare with the exact answer (hint: using a quarter as your monetary unit, construct the PGF of a net win in a single round, raise it to the power of 200 and expand; more than \$3.50 means more than 14 of the new units).
 5. Two dice are rolled followed by dealing as many cards as the number of dots shown by the dice.
 - (a) Find the probability of dealing exactly two aces.
 - (b) Given that exactly two aces have been dealt, what is the (conditional) probability of having obtained more than 10 dots?
 - (c) Given that exactly two aces have been dealt, what is the (conditional) probability that the first die showed the same number of dots as the second die?