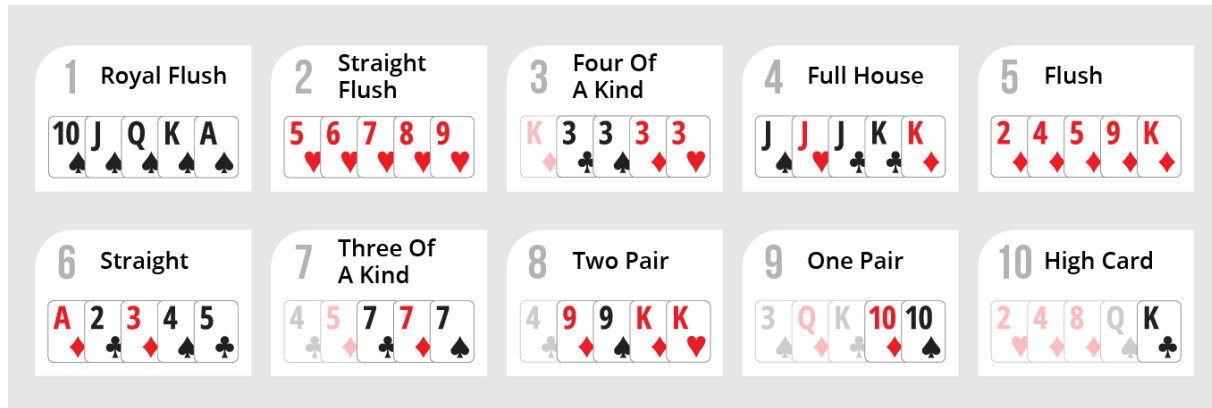


Instructions: Show ALL work neatly for full credit.

1. In poker, there are 10 possible types of 5-card poker hands, as shown in class. For each type, give a formula that gives the total number of hands with that rank. Furthermore (and this is the important part), explain why that formula gives the right number.

TYPES OF POKER HANDS



Note: Be careful not to overcount. When counting flushes for example, you have to make sure to exclude straight flushes and royal flushes which are STRONGER hands.

2. For each situation below, you are betting on the outcome of the roll of TWO dice. In each case, determine the expected value of your bet, and if the bet is favourable. Make sure to properly justify your answer.
 - (a) If you roll an eleven or twelve (i.e. the **sum** of the faces is 11 or 12), you win \$6. If exactly one of the dice is a two, you lose \$2. Otherwise, no money is exchanged.
 - (b) If the **PRODUCT** of the numbers on the dice is odd, you win \$3. Otherwise (i.e. if the product is even), you lose your \$1.
3. In a game of **European** Roulette, you like to bet on lucky number 13. Note that the payoff if you win is the same as for American roulette (i.e. 35 to 1).

What is the probability of showing a profit after you've bet a dollar on that same number 35 times in a row?
Given the answer, is this a viable strategy to win at roulette? Explain your answer in detail.
4. Complete the [Project Outline Form](#) on the course website.