Consider the game with imperfect information where “nature” deals hands to players 1 and 2. Each player receives one card, which has probability $\frac{1}{2}$ of being an ace, A, and probability $\frac{1}{2}$ of being a king, K. Thus the probability of each of the four possible hands is $\frac{1}{4}$. They can bet or fold with player 1 acting first. The vertices where one of the players makes a choice are labeled in the figure as $V_1, \ldots V_8$. Assume the ante is 4 and the bet to stay in is 6 so the payoffs are as given in the following game tree. Also, assume each player always bets if they have an ace. (These edges have a short line through them in the game tree below.)

Each player knows his or her own card but not the card of the other player. Thus the information sets are \{V_1, V_3\}, \{V_2, V_4\}, \{V_5, V_6\}, and \{V_7, V_8\}.

(a) Which choice should player two make on the information set \{V_7, V_8\}? Hint: Since player one always bets at $V_3$, the probability of being at $V_7$ is greater than or equal to the probability of being at $V_8$.

(b) Which choice should player one make on the information set \{V_3, V_4\}? Hint: The chance of being at either vertex is the same, so each is $\frac{1}{2}$, given that the vertex is in the information set \{V_3, V_4\}.

(1) What is the expected payoff for the whole game for each of the two players?