Case 1

Issued: Friday, January 9, 2015
Due: Friday, January 16, 2015

Notes: This case contains seventeen (17) questions and are labeled as (1.1) through (4.5). Please answer all questions concisely and show all work. State any assumptions you are making. This case is graded pass/fail where a passing grade is 10/17 points. Partial credit will be awarded for incorrect answers with appropriate work shown. Using approximations is acceptable.

Scenario: It is Friday, May 30, 2014 and you are returning for the second day of the World Series of Poker (WSOP) Event #3 $1000 No-Limit Hold’em. There are 186 of 2,224 players remaining and you have 63,500 chips, making you 26th of 186 overall at the start of Day 2. You are entering a new table and have no reads. You are already in the money, but the differences between payoffs are immaterial to you until the final table (so act in a way that maximizes expected chips for that hand).

The table is 8-handed as follows. Blinds are 600/1200 with 200 antes. You are on the button and will be in that position for all questions, although chip amounts will vary slightly as the day progresses.

<table>
<thead>
<tr>
<th>Seat</th>
<th>Name</th>
<th>Chip Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SB</td>
<td>22,800</td>
</tr>
<tr>
<td>2</td>
<td>[Empty]</td>
<td>N/A</td>
</tr>
<tr>
<td>3</td>
<td>BB</td>
<td>17,900</td>
</tr>
<tr>
<td>4</td>
<td>UTG</td>
<td>32,400</td>
</tr>
<tr>
<td>5</td>
<td>UTG+1</td>
<td>25,800</td>
</tr>
<tr>
<td>6</td>
<td>MP1</td>
<td>10,000</td>
</tr>
<tr>
<td>7</td>
<td>MP2</td>
<td>29,100</td>
</tr>
<tr>
<td>8</td>
<td>CO</td>
<td>77,100</td>
</tr>
<tr>
<td>9</td>
<td>Hero</td>
<td>63,500</td>
</tr>
</tbody>
</table>
Hand 1:

UTG+1: 25,800  M = 7.59
MP1: 10,000   M = 2.94
Hero (BTN): 63,500  M = 18.68

Pre Flop: (3,400) Hero is BTN with A♣ 9♥
1 fold, UTG+1 raises to 3,600, 1 fold, MP2 calls 3,600, 1 fold, Hero calls 3,600, 2 folds

Flop: (14,200) 2♣ T♣ K♣ (3 players)
UTG+1 bets 3,000, MP2 folds, Hero…

Question 1:

Assumptions: UTG+1 will bet again on the turn, except if it’s a club, in which case he will check/fold to any bet.

What hand is the Hero drawing to? (1.1)
Flush

How likely is he to hit his draw on the next card, or the next two cards? (1.2)

Quick rule: 9 * 2% = 18% for one card, or 9 * 4% = 36% for two cards
Exact: 9/47 ≈ 19% for one card or 1-(38/47*37/46) ≈ 35% for two cards

What percentage of the pot is the Hero contributing to see another card? (1.3)
3,000/20,200 ≈ 15%

Should the Hero make this call? Approximately what is the EV of this call? (1.4)

Yes, call
If one card: EV ≈ 19% * 17,200 – 81%*3,000 = 838
If two cards: EV ≈ 35% * 17,200 – 65%*3,000 = 4,070
What is the largest bet that the Hero can profitably call? (1.5)

**If one card:** \( \frac{x}{(14,200+2x)} = 19\% \) when \( x = 4,350 \)

**If two cards:** \( \frac{x}{(14,200+2x)} = 35\% \) when \( x = 16,550 \)

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Hand 1 (continued):

<table>
<thead>
<tr>
<th>Player</th>
<th>Chips</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTG+1</td>
<td>25,800</td>
<td>7.59</td>
</tr>
<tr>
<td>MP1</td>
<td>10,000</td>
<td>2.94</td>
</tr>
<tr>
<td>Hero (BTN)</td>
<td>63,500</td>
<td>18.68</td>
</tr>
</tbody>
</table>

Pre Flop: (3,400) Hero is BTN with A♣ 9♥

1 fold, UTG+1 raises to 3,600, 1 fold, MP2 calls 3,600, 1 fold, Hero calls 3,600, 2 folds

Flop: (14,200) 2♣ T♣ K♣ (3 players)

UTG+1 bets 3,000, MP2 folds, Hero calls 3,000

Turn: (20,200) 5♦ (2 players)

UTG+1 bets 9,000, Hero…

Question 2:

**Assumptions:** UTG+1 will bet/call any size bet on the river, regardless of the board.

How likely is the Hero to hit his draw on the river? (2.1)

**Flush Draw 9/46 = 19.6\% (18\% quick rule)**

What percentage of the pot is the Hero contributing to see another card? (2.2)

\[ \frac{9,000}{38,200} \approx 23.6\% \]

How much does the Hero have to make on the river to make this a profitable call? Is this realistic? (2.3)
If only flush is good, pot needs to be \(9,000/19.6\% \approx 45,900\), or \(7,700\) more (quick rule \(9,000/18\% \approx 50,000-38,200 = 11,800\))

Villain has \(10,000\) left after this bet, so if you used the quick rule, then it’s not realistic, but if you solved exactly, then it probably is (\(7,770\) more vs \(11,800\) more)

Later in the day, MP1 has been eliminated and has been replaced by a short stack. Your reads are that UTG+1 and BB are aggressive and loose callers. You have identified SB as weak/tight. Chip stacks are as follows.

<table>
<thead>
<tr>
<th>Seat</th>
<th>Name</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SB</td>
<td>19,500</td>
</tr>
<tr>
<td>2</td>
<td>MP1</td>
<td>4,200</td>
</tr>
<tr>
<td>3</td>
<td>BB</td>
<td>5,500</td>
</tr>
<tr>
<td>4</td>
<td>UTG</td>
<td>38,600</td>
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<tr>
<td>5</td>
<td>UTG+1</td>
<td>13,200</td>
</tr>
<tr>
<td>6</td>
<td>[Empty]</td>
<td>N/A</td>
</tr>
<tr>
<td>7</td>
<td>MP2</td>
<td>33,100</td>
</tr>
<tr>
<td>8</td>
<td>CO</td>
<td>90,500</td>
</tr>
<tr>
<td>9</td>
<td>Hero</td>
<td>78,200</td>
</tr>
</tbody>
</table>

Hand 2:

Hero (BTN): 78,200 \(M = 23.00\)
SB: 19,500 \(M = 5.74\)

Pre Flop: (3,400) Hero is BTN with 5♥ 6♦
4 folds, Hero raises to 3,600, SB calls 3,000, 1 fold

Flop: (10,000) 4♣ 7♠ K♥ (3 players)
SB checks, Hero bets 6,000, SB…
Question 3:

Assumptions: SB will call with a two pair or better. If he calls, he will check the turn on any card.

What is the Hero’s fold equity if the SB folds 70% of the time? (3.1)

\[ 70\% \times 10,000 - 30\% \times 6,000 = 5,200 \]

What is the Hero’s EV-if-called after this bet? (3.2)

**Hero’s equity vs 74/K7/K4/44/77/KK is 29% (quick rule 8 * 4% = 32%)**
\[ EV = 16,000 \times 29\% - 6,000 \times 71\% = 380 \text{ (i.e. we prefer a call)} \]

Is the Hero’s bet +EV? (3.3)

Yes, \[ EV = 70\% \times 10,000 + 30\% \times (16,000 \times 29\% - 6,000 \times 71\%) = 7,114 \]

What percentage of the time does SB have to fold to make this bet +EV? (3.4)

\[ EV = 0 = F \times 10,000 + (1-F) \times (16,000 \times 29\% - 6,000 \times 71\%) \text{ at } F < 0\% \]

We have the pot odds to see two more cards, so it’s profitable if he calls 100%

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Hand 2 (continued):

**Hand 2 (continued):**

Hero (BTN): 78,200 \hspace{1cm} M = 23.00
SB: 19,500 \hspace{1cm} M = 5.74

Pre Flop: (3,400) Hero is BTN with 5♥ 6♦
4 folds, Hero raises to 3,600, SB calls 3,000, 1 fold

Flop: (10,000) 4♣ 7♠ K♥ (3 players)
SB checks, Hero bets 6,000, SB raises to 15,700 all in, Hero...

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Question 4:

What hand is the Hero drawing to? (4.1)
Straight

How likely is he to hit his draw on the next two cards? (4.2)

1-(39/47*38/46) ≈ 31% (quick rule 8 * 4% = 32%)

What percentage of the pot is the Hero contributing to see another two cards? (4.3)

9,700/41,400 ≈ 23%

Should the Hero make this call? Approximately what is the EV of this call? (4.4)

Yes, EV = 31,700*31% - 9,700*69% = 3,134

What is the largest raise that the Hero can profitably call? (4.5)

x/(22,000+2x) = 31% when x ≈ 17,947