One draw means the result may be red card or blue card

Attachment 1.1

if the card is red.

$$P(H_0|red) = \frac{P(H_0)\cdot P(red|H_0)}{P(red)} = \frac{0.4\cdot 0.7}{\underbrace{0.4\cdot 0.7+0.6\cdot 0.3}_{0.46}} = 0.608$$

$P(H_1|red) = 1-0.608 = 0.392$

$E(accept\ H_0) = 0.608\cdot 5 - 0.392\cdot 3 = 1.864$

$E(accept\ H_1) = 0.608\cdot -3 + 0.392\cdot 5 = 0.136$

Since $1.864 > 0.136$, a'' is accept H_0

$VSI = E(U(a''|y)|y) - E(U(a'|y))$

$= 1.864 - 0.136 = 1.728$

If the card is blue.

$$P(H_0|blue) = \frac{P(H_0)\cdot P(blue|H_0)}{P(blue)} = \frac{0.4\cdot 0.3}{\underbrace{0.4\cdot 0.3+0.6\cdot 0.7}_{0.54}} = 0.222$$

$P(H_1|blue) = 1-0.222 = 0.778$

$E(accept\ H_0) = 0.222\cdot 5 - 3\cdot 0.778 = -1.225$

$E(accept\ H_1) = -0.222\cdot 3 + 0.778\cdot 5 = 3.224$

Since $3.224 > -1.225$, a'' is accept H_1

$VSI = 3.224 - 3.224 = 0$

$$EVSI = \sum_{i=1}^{2} VSI(y_i)\cdot p(y_i)$$

$= 1.728\cdot 0.46 + 0\cdot 0.54 \doteq 0.795$