

1) Given the following zero-sum game: $\begin{bmatrix} 4 & -7 \\ -3 & 5 \end{bmatrix}$

- If player I plays row 1 25% of the time and row 2 75% of the time, and player II plays column 1 60% of the time and column 2 40% of the time, then find the Expected Payoff.
- If player I plays row 1 40% of the time and row 2 60% of the time, and player II plays column 1 70% of the time and column 2 30% of the time, then find the Expected Payoff.
- Find the optimal strategy for player I. (Vector form)
- Find the optimal strategy for player II. (Vector form)
- Find the expected payoff if each player plays their optimal strategies. (Round to the nearest penny)

2) Ralph and Chuck are playing a game. They each simultaneously choose a number (1, 2, or 3). If they pick the same number, then Chuck pays Ralph that number in dollars. If they don't, then Ralph pays Chuck one dollar. Let Ralph be player I (player I plays rows).

- Construct the matrix that defines this game. (Keep the numbers in order – 1- 2 -3)
- If each player plays each of their possible rows/columns with equal probability, then find the Expected Payoff.
- If Ralph plays row 1 50% of the time, row 2 35% of the time, and row 3 15% of the time, and Chuck plays column 1 20% of the time, column 2 35% of the time, and column 3 45% of the time, then find the Expected Payoff .
(Round to the nearest penny)

3) Given the following zero-sum game: $\begin{bmatrix} 8 & -5 \\ -3 & 5 \end{bmatrix}$

- Find the optimal strategy for player I. (VECTOR FORM)
- Find the optimal strategy for player II. (VECTOR FORM)
- If each entry represents dollars, then find the expected payoff using the optimal strategies.
(Round to the nearest penny)

4) Given the following zero-sum game: $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$

- Find the optimal strategy for player I. (VECTOR FORM)
- Find the optimal strategy for player II. (VECTOR FORM)
- If each entry represents dollars, then find the expected payoff using the optimal strategies.
(Round to the nearest penny)

5) Given the following zero-sum game: $\begin{bmatrix} -10 & 7 \\ 5 & -2 \end{bmatrix}$

- Find the optimal strategy for player I. (VECTOR FORM)
- Find the optimal strategy for player II. (VECTOR FORM)
- If each entry represents dollars, then find the expected payoff using the optimal strategies.
(Round to the nearest penny)

Solutions to Practice 10 (revision 0)

1a) .05 b) -.08 c) $\langle \frac{8}{19}, \frac{11}{19} \rangle$ d) $\begin{bmatrix} \frac{12}{19} \\ \frac{7}{19} \end{bmatrix}$ e) -\$.05 2a) $\begin{bmatrix} 1 & -1 & -1 \\ -1 & 2 & -1 \\ -1 & -1 & 3 \end{bmatrix}$ b) \$0 c) -\$.16

3a) $\langle \frac{8}{21}, \frac{13}{21} \rangle$ b) $\begin{bmatrix} \frac{10}{21} \\ \frac{11}{21} \\ \frac{11}{21} \end{bmatrix}$ c) \$1.19 4a) $\langle 0, 1 \rangle$ b) $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$ c) \$3 5a) $\langle \frac{7}{24}, \frac{17}{24} \rangle$ b) $\begin{bmatrix} \frac{3}{8} \\ \frac{8}{5} \\ \frac{8}{8} \end{bmatrix}$ c) \$.63