**How do the Raiders perform when it rains? –** A study of conditional probability and independence

The following data gives Oakland Raiders’ win/loss total as well as the weather conditions for each game:

|  |  |  |
| --- | --- | --- |
| **Game #** | **Win/Lose** | **Rain/Clear** |
| 1 | W | C |
| 2 | L | R |
| 3 | W | R |
| 4 | W | C |
| 5 | W | C |
| 6 | W | R |
| 7 | L | R |
| 8 | W | C |
| 9 | L | R |
| 10 | L | C |
| 11 | W | C |
| 12 | W | C |
| 13 | W | R |
| 14 | L | R |
| 15 | W | C |

1. Create a Venn Diagram that includes the event W – the Raiders win and R – it rains during the game. Draw two circles. Refer to the event chart above and decide if the circles should overlap. Label the left circle “W” and the right circle “R.” Fill it in using fractions.

|  |
| --- |
|  |

1. Now fill in the two-way table using counts below:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **wins** | **losses** | **Total** |
| **Rain** |  |  |  |
| **Clear** |  |  |  |
| **total** |  |  |  |

1. Using the event chart, the Venn diagram, or the two-way table, write the symbol and find the following probabilities:

Symbol Probability

* 1. The Raiders win. P(W) 10/15 = .67
  2. It rains \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  3. The Raiders lose. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  4. It’s clear \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  5. The Raiders win and it rains \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  6. The Raiders win or it rains \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  7. The Raiders win and its clear \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  8. The Raiders win or its clear \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  9. Given that it rains, the Raiders win \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  10. Given that its clear, the Raiders win \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  11. Given that the Raiders win, it rains \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_
  12. Given that the Raiders win, it’s clear \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_

1. Is the Raiders’ performance independent of weather? Do they play better in the rain, worse, or about the same? Write a few sentences below. Start by defining “independence.” Which probabilities above are most useful to your analysis?