## Question 1

(25 marks)
An experiment consists of throwing two fair, standard, six-sided dice and noting the sum of the two numbers thrown. If the sum is 9 or greater it is recorded as a "win" (W). If the sum is 8 or less it is recorded as a "loss" (L).
(a) Complete the table below to show all possible outcomes of the experiment.

|  |  | Die 2 |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 1 | 2 | 3 | 4 | 5 | 6 |
| $\stackrel{\rightharpoonup}{0}$ | 1 |  | L |  |  |  |  |
|  | 2 |  |  |  |  |  |  |
|  | 3 |  |  |  |  |  |  |
|  | 4 |  |  |  |  |  |  |
|  | 5 |  |  |  |  |  | W |
|  | 6 |  |  |  |  |  |  |

(b) (i) Find the probability of a win on one throw of the two dice.

(ii) Find the probability that each of 3 successive throws of the two dice results in a loss. Give your answer correct to four decimal places.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- | :--- |

(c) The experiment is repeated until a total of 3 wins occur. Find the probability that the third win occurs on the tenth throw of the two dice. Give your answer correct to four decimal places.


