6.2 *Exercise 2*

A process had three steps. The probability of failure for each step equated to the roll of two dice. The probability of failure for the first step was equivalent to rolling two one's, i.e., snake eyes. The probability of failure for the second step was the equivalent of the roll of a seven. The probability of failure for the third step was the equivalent of rolling 11 or higher. Determine the probability of a part being manufactured with no failure.

The probability of failure for each step is
P(failure step 1) = 1/36
P(failure step 2) = {6,1; 5,2; 4,3; 3,4; 2,5; 1,6}/36 = 6/36
P(failure step 3) = {6,5; 5,6; 6,6}/36 = 3/36
The probability for no failure is
P(no failure) = (35/36)(30/36)(33/36) = 0.743

6.5 *Exercise 6*

Consider that you have two automobiles and the probability of starting each of them is 0.8 on cold mornings. Determine the expected number of days neither car will start during the year if there are 100 cold days during the year.

	Description	Response
1	Probability of at least one car starting	0.96
2	Number of days at least one car not expected to start	4

1. Probability of at least one car starting: $0.8 + 0.8 - (0.8 \times 0.8) = 0.96$

2. Number of days at least one car not expected to start = $100 - (100 \times 0.96) = 4$

Another way to analyze the problem is: The probability of car #1 not starting is 0.2. The probability of both cars not starting (i.e., you are not going to be trying to start the second car until the first car did not start) is $0.2 \times 0.2 = 0.04$. Hence, the probability of at least one car starting is $1-0.04 = 0.96$; the same answer.

The second step would be the same, remembering that there are 100 cold mornings during the year.