

**SOLUTION TO THE QUESTION FOR MATH 343 FOR  
THE LECTURE OF FRIDAY 9 APRIL**

**Problem 1.** Two fair standard dice are rolled. What is the probability that the sum of the two numbers is at least 11?

*Solution.* Say the two dice are red and black. There are  $6^2 = 36$  possible rolls, all equally likely. Here is a list, as ordered pairs, with first coordinate the number on the red die and second coordinate the number on the black die:

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

Of these, exactly three give a total of at least 11, namely (5, 6), (6, 5), and (6, 6). Therefore the probability is

$$\frac{3}{36} = \frac{1}{12}.$$

This is the answer. □