6.5 Recursion revisited

Question 1 _____ / 2

What is the expected number of rolls of a six-sided die that is rolled until a 1 appears?

$E[X] = \frac{1}{6}(1) + \frac{5}{6}(1 + E[X])$

$E[X] = 6$

Question 2 _____ / 2

A pair of dice are thrown until at least one of the die comes up 1 for the first time. How many tosses, on average, are required?

We are rolling two die, which comes out to:

(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)

a. What is the sample size? 36

b. How many of these rules have at least one 1? 11

c. What is the probability of getting at least one? $\frac{11}{36}$
($Prob(E) = n(E)/n(S)$)

d. Use the formula to find the expected value (average trials). $E[X] = \frac{11}{36}(1) + \frac{25}{36}(1 + E[X])$
$E[X] = \frac{36}{11}$