

1. A pair of dice, one red and one green, is rolled. What is the probability

$$n(S) = 36$$

7pts

a) the sum of the two numbers is 7? $E = \{(1,6), (6,1), (2,5), (5,2), (3,4), (4,3)\}$

$$P(\text{sum} = 7) = \frac{6}{36} = \frac{1}{6}$$

7pts

b) the sum is 7 if you know that the red die is a 3?

$$P(\text{sum} = 7 | \text{red} = 3) = \frac{P(\text{sum} = 7 \text{ and red} = 3)}{P(\text{red} = 3)} = \frac{1/36}{6/36} = \frac{1}{6}$$

2. Suppose A and B are independent events with $P(A) = .4$ and $P(B) = .5$. Find each of the following.

4pts

a) $P(A \cap B) = P(A)P(B) = (.4)(.5) = .2$

4pts

b) $P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{.2}{.5} = .4$

4pts

c) $P(A \cup B) = P(A) + P(B) - P(A \cap B) = .4 + .5 - .2 = .7$

4pts

d) $P(A|B^c) = \frac{P(A \cap B^c)}{P(B^c)} = \frac{.2}{.5} = .4$

