Math 213 Discussion Worksheet – Week 13

Solutions.

1. $P(A = 3) = \boxed{1/6}$

2. $P(A = 2) + P(A = 3) + P(A = 5) = 1/6 + 1/6 + 1/6 = \boxed{1/2}$

3. $P(B = \text{Ace of Diamonds}) + ... + P(B = \text{King of Diamonds}) = 131/52 = \boxed{1/4}$

4. $P(A = 4)P(B = \text{Ace of Spades}) = 1/61/52 = \boxed{1/312}$

5. $P(A = 1)P(A = 3) + P(A = 3)P(A = 1) = 1/36 + 1/36 = \boxed{1/18}$

6. $P(A = 1)P(A = 3) + P(A = 3)P(A = 1) = 1/36 + 1/36 = \boxed{1/18}$. This is the same answer as the problem above because in both cases the outcome for each individual dice remains independent of the other regardless of whether or not they are thrown simultaneously. Another way of calculating the same answer is to consider that the first dice can be a one or a three but the second can only be one number - the opposite of the first dice, i.e. a 3 if the first dice was 1, or a 1 if the first dice was 3. That gives: $P(A = 1 \text{ or } A = 3) \times P(\text{opposite}) = 2/6 \times 1/6 = 2/36 = 1/18$.

7. Here are the possible combinations: $1 + 6 = 2 + 5 = 3 + 4 = 7$. Probability of getting each of the combinations are 1/18 as in exercise 6. There are 3 such combinations, so the probability is $3 \times 1/18 = \boxed{1/6}$.

8. $P(A = C) = P(1, 1) + P(2, 2) + ... + P(6, 6) = 6 \times 1/36 = \boxed{1/6}$

9. Since both dice are fair, $C > A$ is just as likely as $C < A$. So

$$P(C > A) = P(C < A) = X$$

and

$$P(C > A) + P(C < A) + P(A = C) = 1$$

But

$$P(A = C) = 1/6$$

so

$$P(C > A) + P(C < A) = 5/6$$

$$2X = 5/6, X = \boxed{5/12}$$