

## Assignment Cover Sheet

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Faculty:	Computing Science		
Course:		Stage/ year:	2
Subject:	Probability and Stat		
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Lecturer Name:	Paddy Fahy		
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**1. (a) What is the probability that the result will be an even number on a throw of a six-sided die?**

**(b) If the probability of winning a game is 0.6, what is the probability of losing?**

Answer(a):

Total outcomes = 6      As we know it's a six faced die.

Possible outcomes = 3      As we know there are three odd and three even faces.

So,  $P(\text{odd}) = \text{Possible outcomes} / \text{Total outcomes}$

$$= 3 / 6$$

$$= \frac{1}{2}$$

Hence, the probability of getting an odd number is  $\frac{1}{2}$

Answer (b):

We know that the total probability is always 1.

Probability of winning game is 0.6

$$\begin{aligned}\text{Probability of losing game} &= 1 - 0.6 \text{ (Total probability - Winning probability)} \\ &= 0.4\end{aligned}$$

- 2. What is the probability that on two throws of a die the result each time will be an even number?**

Answer:

The probability of getting an even number is

3 out of 6

As we know total Total outcomes is 6 and we have 3 even faces.

Probability of getting even number in two throws will be

$$\begin{aligned}P(2E) &= (3/6 * 3/6) \\ &= (1/2 * 1/2) \\ &= 1/4\end{aligned}$$

So, the probability of getting even number on two throws will be  $1/4$ .

- 3. What is the probability of throwing a 2 followed by an even number greater than 2 with a six-sided die?**

Answer:

Total outcomes = 6

Probability of throwing 2 =  $1/6$

Probability of throwing even number greater than 2 =  $2/6$

(Even number greater than 2 are 4 and 6)

Now,

$$\begin{aligned}P(2 \text{ F by even number } > 2) &= (1/6 * 2/6) \\ &= 1/18\end{aligned}$$

So, the probability of getting 2 followed by an even number greater than 2 is  $1/18$ .

- 4. What is the probability of drawing a club or a king from a well-shuffled pack of 52 cards?**

Answer:

Probability of drawing a club =  $13/52$

(As we know there are 13 cards in each sets)

Probability of drawing a king =  $4/52$

(As there are 4 kings)

$$\begin{aligned} P(C \text{ or } K) &= 4/52 + 13/52 \\ &= 17/52 \end{aligned}$$

But since we are drawing club as well we must minus 1 so

$$\begin{aligned} P(C \text{ or } K) &= 17/52 - 1/52 \\ &= 16/52 \end{aligned}$$

So, the probability of drawing a club or a king is  $16/52$ .

**5. What is the probability of drawing a red picture card from a well-shuffled pack?**

Answer:

As, we know there are 12 pictured cards.

Total cards = 52

Total pictured cards = 12

No, of red pictured cards = 6

So,  $p(RP) = 6/52$

**6. Show clearly how to calculate the probability of drawing a red card followed by an ace from a well-shuffled pack?**

Answer:

Number of red cards = 26

Number of Aces = 04

Total Cards in a well shuffled pack = 52

1st draw

$$P(\text{Red cards}) = \text{Number of red cards} / \text{Total cards} = 26/52$$

Hence, Probability of drawing a red card from a well shuffled pack of cards is  $26/52$ .

2nd draw

As we took one card in our first draw. So, the total number of cards remaining are 51.

There is possibility of drawing a red ace on first draw.

\*\*\*\* If the red Ace is drawn on first draw.

$$P(\text{Ace on 2}^{\text{nd}} \text{ Draw}) = \text{Remaining Aces} / \text{Total Remaining Cards} = 3 / 51$$

$$P(\text{R card followed A}) = (26/52) \times (3/51) = 1/34$$

So, Probability of drawing a red card followed by an ace card if a red ace is drawn on first draw is  $1/34$ .

\*\*\*\*\*If the red Ace is not drawn on first draw.

$$P(\text{Ace on 2}^{\text{nd}} \text{ Draw}) = \text{No. Of Aces} / \text{Total Cards Remaining} = 4 / 51$$

$$P(\text{R followed by A}) = (26/52) \times (4/51) = 2/51$$

So, Probability of drawing a red card followed by an ace if the ace is not drawn on first draw is  $2/51$ .

There can be two different outcomes that we might draw an ace On first draw or we might not.

So, Probability of drawing a red card followed by an ace =

$$P(\text{if ace is drawn on first draws}) + P(\text{if ace is drawn on 2}^{\text{nd}} \text{ draw only})$$

$$= (1/34) + (2/51)$$

$$= 7/102$$

**7. On a roll of two dice, what is the probability that the sum of the numbers on the upper faces is:**

**(a) 3**

Answer:

We can get the sum 3 by only two ways that is getting 1 on the first and 2 on the second or vice versa.

Total outcomes = 36

Possible outcomes = 2

Hence, the probability of getting 3 = Possible Outcomes / Total outcomes  
= 2/36

**(b) 7**

We can get the sum 7 by ways that is getting (4,3), (6,1), (5,2) on the second or vice versa.

Total outcomes = 36

Possible outcomes = 3

Hence, the probability of getting 3 = Possible Outcomes / Total outcomes  
= 3/36

**8. A coin is thrown three times in succession. What is the probability heads? Of getting two**

Answer:

The possible outcomes when tossing a coin three times in succession are

H-H-H, T-H-T, H-T-H, H-H-T, T-H-T, T-T-H, H-T-T, T-T-T

Total outcomes: 8

Possible outcomes: 3

As we can see above outcomes so we can say the probability of getting two heads is 3/8

**9. A coin is thrown three times in succession. What is the probability of getting tails at least once?**

Answer:

H-H-H, T-H-T, H-T-H, H-H-T, T-H-T, T-T-H, H-T-T, T-T-T

The probability of getting tails at least once is 7/8

As, Total outcomes = 8

Possible outcomes = 7

**10. On a throw of four fair coins, what is the probability of getting two heads and two tails?**

Answer:

The possible outcomes we can get by throwing coins 4 times are:

HHHH, HHHT, HHTH, HHTT, HTHH, HTHT, HTTH, HTTT, THHH, THHT, THTH, THTT, TTHH, TTHT, TTTH, TTTT

Total outcomes = 16

Possible outcomes = 6

Hence, the probability of getting two heads and two tails is  $\frac{6}{16}$