

## Clive On Probability – Answers

Clive is tackling his probability homework and knows that he's made mistakes somewhere.

Can you spot and correct the mistakes Clive has made?

Can you explain what mistakes Clive has made, and maybe give him some tips so that he (hopefully) doesn't make them again?

### Question 1:

There are 9 black counters and 11 white counters in a bag.

I pick one counter from the bag at random.

What is the probability I pick a black counter?

*Clive's answer:*

Probability is calculated:  

$$\frac{\text{Outcome I want}}{\text{Other Outcomes}}$$

*Answer:*

$$\frac{9}{11}$$

*Your answer:*

Probability is calculated:  

$$\frac{\text{Outcome I want}}{\text{Total Outcomes}}$$

*Answer:*

$$\frac{9}{20}$$

*What mistake has Clive made?*

He only counted the white counters for the denominator and not the total number of counters.

### Question 2:

In a fairground game there are the following coloured cards:

30 red, 7 blue and 3 green

The game costs 20p to play and cards are picked at random.

If you pick a:

- red card you lose
- blue card you get another go
- green card you win £1

Calculate the probability that I won't win £1 with one pick.

*Clive's answer:*

Not winning means I lose:

Red is lose.

*Answer:*

$$\frac{30}{40} = \frac{3}{4}$$

*Your answer:*

Not winning £1 means picking red or blue.

*Answer:*

$$\frac{37}{40}$$

*What mistake has Clive made?*

He hasn't included all the outcomes where you don't win £1.

**Question 3:**

Two fair dice are rolled and the total dots are given as your score.  
What is the probability of getting a score greater than 9?

*Clive's answer:*

$$\begin{aligned}P(\text{scoring } 9) &= \frac{4}{36} \\P(\text{scoring } 10) &= \frac{3}{36} \\P(\text{scoring } 11) &= \frac{2}{36} \\P(\text{scoring } 12) &= \frac{1}{36} \\ \text{Answer:} \\ \frac{10}{36} &= \frac{5}{18}\end{aligned}$$

*Your answer:*

$$\begin{aligned}\text{Scoring greater than 9:} \\P(\text{scoring } 10) &= \frac{3}{36} \\P(\text{scoring } 11) &= \frac{2}{36} \\P(\text{scoring } 12) &= \frac{1}{36} \\ \text{Answer:} \\ \frac{6}{36} &= \frac{1}{6}\end{aligned}$$

*What mistake has Clive made?*

He included the probability of scoring 9.

**Question 4:**

To start a board game I must roll a 5 or a 6 followed by another 5 or 6.  
What is the probability of having two throws and being able to start the board game?

*Clive's answer:*

$$\begin{aligned}\text{Probability of rolling a 5 or 6 is:} \\ \frac{2}{6} &= \frac{1}{3} \\ \text{I need to roll that twice.} \\ \frac{1}{3} &+ \frac{1}{3} \\ \text{Answer:} \\ \frac{2}{3}\end{aligned}$$

*Your answer:*

$$\begin{aligned}\text{Probability of rolling a 5 or 6 is:} \\ \frac{2}{6} &= \frac{1}{3} \\ \text{I need to roll that twice.} \\ \frac{1}{3} &\times \frac{1}{3} \\ \text{Answer:} \\ \frac{1}{9}\end{aligned}$$

*What mistake has Clive made?*

He added the probabilities instead of multiplying them.