

Worksheet: Conditional Probability: Tree Diagrams



Q1: A bag contains 13 white balls and 11 black balls. If 2 balls are drawn consecutively without replacement, what is the probability that both balls are white?

A $\frac{13}{46}$

B $\frac{12}{23}$

C $\frac{13}{24}$

D $\frac{169}{576}$

Q2: A bag contains 27 white balls and 6 black balls. If 2 balls are drawn consecutively without replacement, what is the probability that the second ball is black given that the first is black?

A $\frac{13}{16}$

B $\frac{5}{32}$

C $\frac{2}{11}$

D $\frac{5}{33}$

Q3: A bag contains 8 red balls and 8 black balls. If two balls are drawn without replacement, what is the probability of getting one red ball and one black ball?

A $\frac{4}{15}$

B $\frac{1}{4}$

C $\frac{1}{2}$

D $\frac{8}{15}$



Question Video

Q4: A bag contains 21 red balls and 15 black balls. If two balls are drawn without replacement, what is the probability of getting one red ball and one black ball?

A $\frac{1}{4}$

B $\frac{35}{144}$

C $\frac{35}{72}$

D $\frac{1}{2}$



Question Video

Q5: The probability that it rains on a given day is 0.6. If it rains, the probability that a group of friends plays football is 0.2. If it does NOT rain, the probability that they play football rises to 0.8.

► Work out the probability that it rains on a given day and the friends play football.

A 0.08

B 0.12

C 0.32

D 0.48

E 0.88

► Work out the probability that it does NOT rain on a given day and the friends play football.

A 0.08

B 0.32

C 0.48

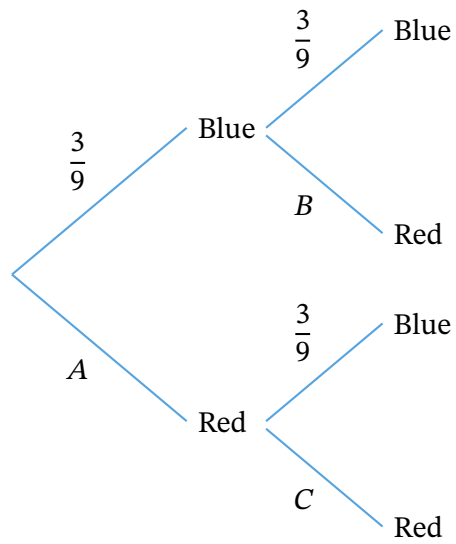
D 0.12

E 0.68

► What is the probability that the friends will play football on a given day?

- A 0.08
- B 0.44
- C 0.32
- D 0.12
- E 0.48

Q6: A bag contains a total of nine marbles: three are blue and six are red. Michael randomly takes a marble from the bag, records its color, and puts it back in. He then repeats this process. He draws the following tree diagram.



► Write the values of the probabilities A , B , and C in the probability tree. Give your answers as unsimplified fractions.

A $A = \frac{3}{9}, B = \frac{3}{9}, C = \frac{3}{9}$

B $A = \frac{8}{9}, B = \frac{8}{9}, C = \frac{8}{9}$

C $A = \frac{6}{9}, B = \frac{6}{9}, C = \frac{6}{9}$

D $A = \frac{1}{9}, B = \frac{1}{9}, C = \frac{1}{9}$

E $A = \frac{1}{27}, B = \frac{1}{27}, C = \frac{1}{27}$

► Use the probability tree to calculate the probability of choosing two blue marbles. Give your answer as a simplified fraction.

A $\frac{8}{9}$

B $\frac{1}{27}$

C $\frac{1}{9}$

D $\frac{2}{9}$

E $\frac{4}{9}$

► Calculate the probability of choosing at least one red marble. Give your answer as a simplified fraction.

A $\frac{4}{9}$

B $\frac{2}{3}$

C $\frac{8}{9}$

D $\frac{5}{9}$

E $\frac{1}{9}$

Q7: It is a little known fact that drugs have been used to enhance performance in sports since the original Olympic Games (776 to 393 BC). In fact, the origin of the word “doping” is thought to come from the Dutch word “doop,” which is a type of opium juice used by the ancient Greeks.

Currently, in all major sporting events, drug testing has become standard practice. However, it is known that not all those who test positive for drugs have actually taken drugs. This is called the “false positive effect.” Similarly, there is a “false negative effect,” where someone who tests negative for drugs has actually taken drugs.

In 2003, after anonymous testing of almost 1,500 players, the MLB (Major League Baseball) announced that approximately 6% of MLB players used performance-enhancing drugs. There was, however, a 5% chance that those who tested positive had not taken drugs and a 10% chance that those who had taken drugs tested negative.

► Find the probability that an MLB player chosen at random had not taken drugs and tested positive.

A 0.103

B 0.05

C 0.047

D 0.054

E 0.25

► Find the probability that an MLB player chosen at random had taken drugs and tested positive.

A 0.187

B 0.9

C 0.054

D 0.047

E 0.25

► Find the probability that an MLB player chosen at random had positive test results.

A 0.29

B 0.95

C 0.101

D 0.06

E 0.5

Q8: A bag contains 22 red balls and 15 black balls. One red ball is removed from the bag and then a second ball is drawn at random. Find the probability that the second ball is black. Give your answer to three significant figures.

A 0.682

B 0.248

C 0.407

D 0.417

E 0.158

Q9: Suppose two spinners are spun. The first has 5 equal sectors numbered from 1 to 5, and the second has 9 equal sectors numbered from 1 to 9. Using a tree diagram or otherwise, find the probability that both spinners stop at odd numbers.

A 25 out of 40

B 12 out of 40

C 15 out of 45

D 30 out of 45

E 27 out of 45