

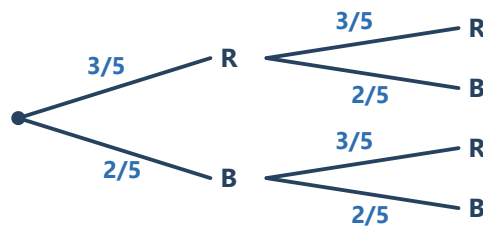
GCSE Maths: Tree diagrams: with and without replacement (Foundation): answers

GCSE Maths - Probability - Foundation - Lesson 23.6

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch23-probability/foundation/tree-diagrams-with-and-without-replacement/

Exercise 23G Tree diagrams: independent events and replacement Non-calculator

- 1 A bag has 3 red counters and 2 blue counters. A counter is picked at random, its colour is noted and it is put back. A second counter is then picked. Find the probability that...



- (a) both counters are red

Answer: $\frac{9}{25}$

- (b) both counters are blue

Answer: $\frac{4}{25}$

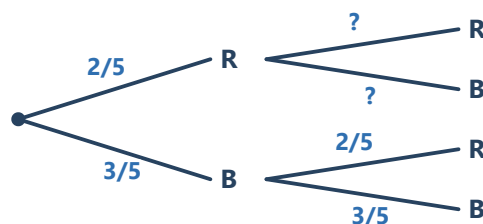
- (c) the counters are different colours

Answer: $\frac{12}{25}$

- (d) at least one counter is red

Answer: $\frac{21}{25}$

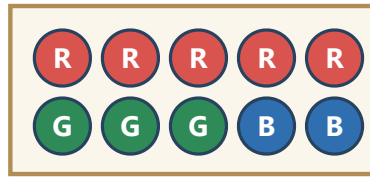
- 2 The tree diagram shows two independent spins of a spinner that is red with probability $\frac{2}{5}$ and blue with probability $\frac{3}{5}$. Complete the missing probabilities, marked ?.



Answer: $\frac{2}{5}$ (red) and $\frac{3}{5}$ (blue)

- 3 A bag has 5 red, 3 green and 2 blue counters. A counter is picked, replaced, and a second counter is picked. Find the probability that...

The bag



- (a) both counters are red

Answer: $\frac{1}{4}$

- (b) both counters are the same colour

Answer: $\frac{19}{50}$

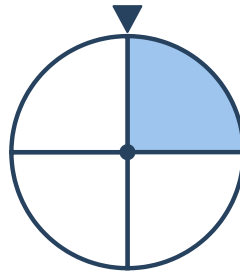
- (c) the first is green and the second is blue

Answer: $\frac{3}{50}$

- (d) neither counter is red

Answer: $\frac{1}{4}$

- 4 A fair spinner has 4 equal sections and one of them is shaded. It is spun twice. Find the probability that the shaded section comes up...



- (a) both times

Answer: $\frac{1}{16}$

- (b) exactly once

Answer: $\frac{3}{8}$

- (c) at least once

Answer: $\frac{7}{16}$

- 5 The probability of rain on any day is 0.4. Two days are independent. Draw a tree diagram and find the probability of...

- (a) rain on both days

Answer: 0.16

- (b) no rain on either day

Answer: 0.36

- (c) rain on exactly one day

Answer: 0.48

- 6 In a game, Zara takes two free throws. The probability that she scores each throw is 0.7, independently. Find the probability that she scores...

- (a) both throws

Answer: 0.49

- (b) exactly one throw

Answer: 0.42

- (c) at least one throw

Answer: 0.91

- 7 To get a licence, Rav must pass a theory test and a practical test. The probability that he passes the theory test is 0.85 and the probability that he passes the practical test is 0.9. The two tests are independent. Draw a tree diagram and find the probability that he...

- (a) passes both tests

Answer: 0.765

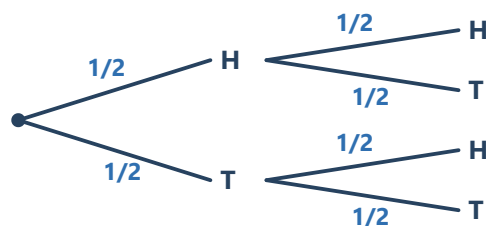
- (b) passes exactly one test

Answer: 0.22

- (c) fails both tests

Answer: 0.015

- 8 A fair coin is tossed twice. Use the tree diagram to find the probability of getting two tails.



Answer: $\frac{1}{4}$

- 9 A biased coin lands on heads with probability 0.6. The coin is tossed twice. Show that the probability of getting exactly one head is 0.48.

Answer: 0.48

- 10 Maria says: "The probabilities on the branches of a tree diagram that leave the same point always add up to 1." Explain why she is right.

Answer: One of the outcomes must happen

- 11 A bag has 10 counters. Four are red and the rest are blue. A counter is picked at random, replaced, and another is picked. Find the probability that the counters are different colours.

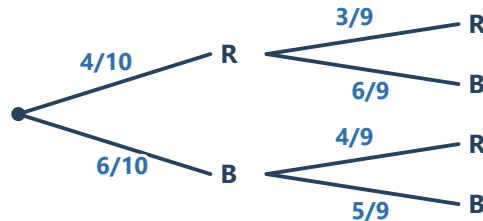
Answer: $\frac{12}{25}$

- 12 A bag has 2 red, 1 blue and 1 green counter. A counter is picked, replaced, then another is picked. Find the probability that the two counters are the same colour.

Answer: $\frac{3}{8}$

Exercise 23H Tree diagrams: dependent events and no replacement Non-calculator

- 1 A bag has 4 red counters and 6 blue counters. Two counters are taken at random **without replacement**. Find the probability that...



- (a) both counters are red

Answer: $\frac{2}{15}$

- (b) both counters are blue

Answer: $\frac{1}{3}$

- (c) the counters are the same colour

Answer: $\frac{7}{15}$

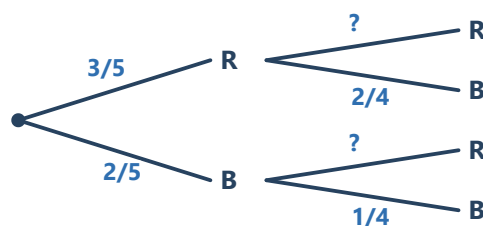
- (d) the counters are different colours

Answer: $\frac{8}{15}$

- (e) at least one counter is red

Answer: $\frac{2}{3}$

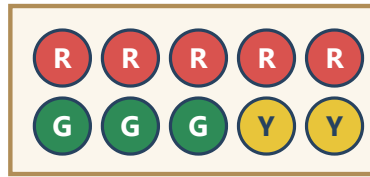
- 2 A bag has 3 red and 2 blue counters. Two counters are taken without replacement. The tree diagram is shown with some probabilities missing. Work out the missing probabilities, then find the probability that both counters are blue.



Answer: $\frac{2}{4}$ and $\frac{3}{4}$; $P(\text{both blue}) = \frac{1}{10}$

- 3 A bag has 5 red, 3 green and 2 yellow counters. Two counters are taken without replacement. Find the probability that...

The bag



- (a) both are red

Answer: $\frac{2}{9}$

- (b) the first is green and the second is yellow

Answer: $\frac{1}{15}$

- (c) both are the same colour

Answer: $\frac{14}{45}$

- (d) neither is red

Answer: $\frac{2}{9}$

- 4 A box has 5 milk and 3 dark chocolates. Maya eats two chocolates at random. Find the probability that she eats...

- (a) two dark chocolates

Answer: $\frac{3}{28}$

- (b) one of each type

Answer: $\frac{15}{28}$

- (c) at least one dark chocolate

Answer: $\frac{9}{14}$

- 5 A drawer holds 6 black socks and 4 white socks. Without looking, Tom takes out two socks. Find the probability that he gets a matching pair.

Answer: $\frac{7}{15}$

- 6 A class has 7 girls and 5 boys. Two students are chosen at random to give out books. Find the probability that...

- (a) both are boys

Answer: $\frac{5}{33}$

- (b) one is a girl and one is a boy

Answer: $\frac{35}{66}$

- 7 A raffle has 20 tickets. Jo has 5 of them. First prize and second prize are drawn at random (a ticket cannot win twice). Find the probability that Jo wins...

(a) both prizes

Answer: $\frac{1}{19}$

(b) at least one prize

Answer: $\frac{17}{38}$

- 8 Sam says: "A bag has 3 red and 2 blue counters. Two counters are taken without replacement. $P(\text{both red}) = \frac{3}{5} \times \frac{3}{5} = \frac{9}{25}$." Explain Sam's mistake and find the correct probability.

Answer: $\frac{3}{10}$

- 9 In a bag there are 4 red and 6 blue counters. Show that, when two counters are taken without replacement, the probability of red then blue is the same as the probability of blue then red.

Answer: Both are $\frac{4}{15}$