Tree Diagrams

GCSE Maths · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

120 people go to a cinema: 70 adults and 50 children. 40 adults and 15 children buy popcorn. Draw a frequency tree and find the probability that a person chosen at random bought popcorn.

Step 1 · First split

Adults 70, children 50

Step 2 · Second split

Adults: 40 popcorn, 30 none. Children: 15 popcorn, 35 none

Step 3 · Popcorn total

40 + 15 = 55 out of 120

Answer: 55/120 = 11/24

Check: 40 + 30 + 15 + 35 = 120 ✓

2. Now try one with the steps

The probability it rains on any day is 0.3, independently. Find the probability that it rains on exactly one of two days.

Step 1 · Rain then dry

Step 2 · Dry then rain

Step 3 · Add the two routes

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Of 60 pupils, 25 have a pet. Of those with a pet, 10 have a dog. A pupil is chosen at random. What is the probability that they have a dog? [2]

2. What do the probabilities on a pair of branches from the same point always add up to? [1]

3. A and B are independent, with P(A) = 0.6 and P(B) = 0.5. Find P(A and B). [1]

4. A fair coin is flipped twice. Find P(two heads). [1]

5. P(Zain passes his driving test first time) = 0.7. If he fails, P(he passes the second time) = 0.8. Find P(he passes within two attempts). [3]

6. A bag has 4 red and 6 blue beads. Two are taken WITH replacement. Find P(both red). [2]

7. From the same bag, two are taken WITHOUT replacement. Find P(both red). [2]

8. Without replacement, find P(one red and one blue). [3]

9. Without replacement, find P(at least one red). [3]

10. A box has 3 milk and 2 dark chocolates. Sophie eats two at random. Find P(both dark). [2]

11. A spinner lands on red with probability 0.2. It is spun three times. Find P(no reds). [2]

12. Using the spinner in question 11, find P(at least one red). [1]

13. A bag has 5 red, 3 blue and 2 green balls. Two are taken without replacement. Find P(both the same colour). [4]

14. A drawer has 6 black and 4 white socks. Two are taken at random. Find P(they match). [3]

15. A bag has 3 red and 2 blue counters. Three are taken without replacement. Find P(all three are red). [3]

4. Before you hand it in

Without replacement: P(both red) = 4/10 × 4/10
After one red is taken there are 3 red out of 9 left: 4/10 × 3/9 = 2/15.

P(red then blue) = 4/10 + 6/9
'Then' means both happen: MULTIPLY along the branch. Add only between separate routes.

P(one of each) = 4/10 × 6/9 only
Red-then-blue and blue-then-red both give one of each. Add both routes: 24/90 + 24/90 = 8/15.

P(at least one red) = P(exactly one red)
'At least one' includes one OR two. Use 1 − P(none).