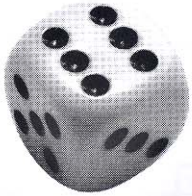
2. A fair dice is thrown twice.



Find the probability that a 2 was scored on the first throw and a 4 on the second throw.

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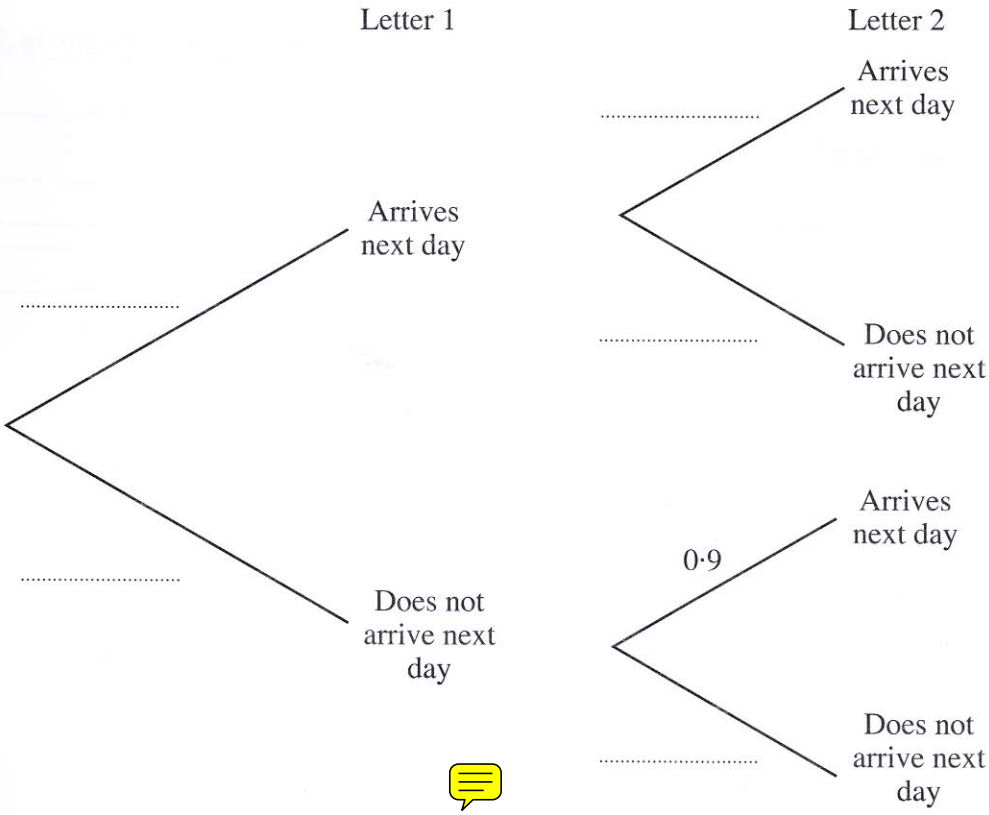
[2]

14. Suppose that 90% of first class letters posted before 3 pm on a Tuesday arrive at their destination on the next day.

(a) Complete the following tree diagram to show the probabilities of what can happen when two first class letters are posted independently before 3 pm on a Tuesday.



[2]

(b) Calculate the probability that exactly one of the first class letters arrives the next day.

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[2]

20. One hundred raffle tickets are sold. The tickets sold are numbered from 1 to 100.
The raffle tickets are placed in a drum for a draw.
Two raffle tickets are selected, one ticket at a time and not replaced in the drum.

(a) Find the probability that one of the tickets drawn is odd and the other is even.

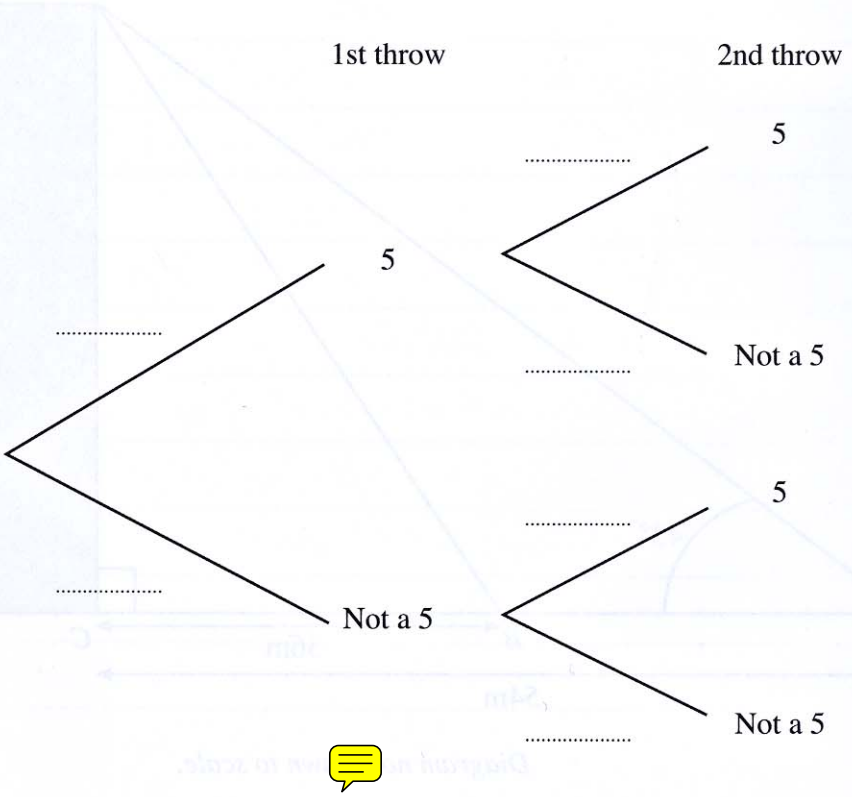
[3]

(b) Find the probability that at least one of the tickets drawn is odd.

[3]

12. Carol has a fair 20-sided dice. Each face of the dice is labelled with one of the ten numbers 0 to 9 and each number is used twice. She throws the dice twice and each time she records whether or not the number is a 5.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that, on 2 throws of the dice, Carol gets exactly one 5.

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[2]

4. One "lucky draw" machine contains 20 balls numbered 1 to 20 respectively.
Another machine contains 12 balls numbered 101 to 112 respectively.
Each machine selects one ball at random. Calculate the probability that one of the selected balls is numbered 10 and the other is numbered 110.

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[3]

24. Rice is sold in large bags. The bag of rice is a mixture of 60% white long grain and 40% black wild rice. Two grains of rice are selected at random.
Calculate the probability that

(a) both the grains are black wild rice,

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[2]

(b) there is at least one grain of black wild rice.

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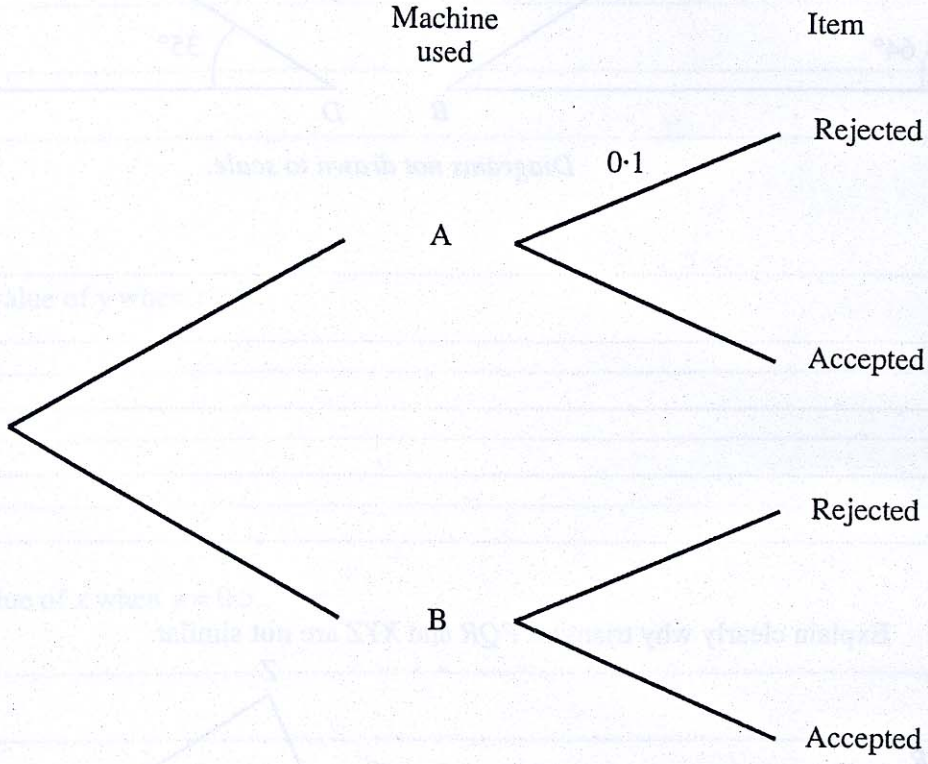
[3]

9. A factory has two machines, A and B, which it uses to make large numbers of a certain item. Machine A is used to make 60% of the factory's total output and Machine B is used for the remainder. The probability that an item made on Machine A is rejected is 0·1. The probability that an item made on Machine B is rejected is 0·2.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that an item chosen at random is accepted.

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[2]

20. A clown has seven pairs of shoes, one pair in each of the colours of the rainbow. The shoes are kept in a trunk in a dark room. The clown selects two shoes at random.

(a) What is the probability that the clown selects one left shoe and one right shoe?

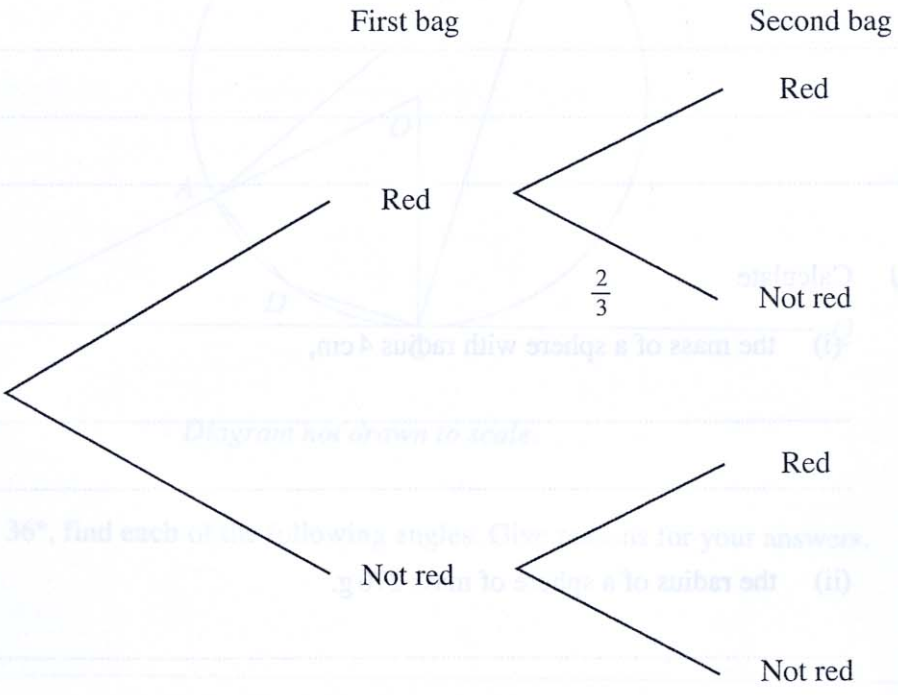
[3]

(b) What is the probability of selecting a matching pair of shoes?

[2]

11. Two bags contain some coloured balls, which are identical except for their colour.
One ball is taken at random from each bag and their colours noted.
The probability of the selected ball from the first bag being red is $\frac{1}{4}$.
The probability of the selected ball from the second bag NOT being red is $\frac{2}{3}$.

(a) Complete the following tree diagram. [2]



(b) Calculate the probability that both balls are red.

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[2]

(c) Calculate the probability that only one ball is red.

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[3]

21. A candidate sits a multiple choice examination. For each question in the examination, five possible answers are given but only one of these answers is correct. The candidate knows 70% of the facts tested in the examination and for each question based on these facts she selects the correct answer. On all other questions she selects at random one of the five possible answers.

(a) A question is selected at random from the paper. Calculate the probability that the candidate correctly answers the question.

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[4]

(b) The examination has 150 questions. Calculate how many questions you might expect the candidate to answer correctly.

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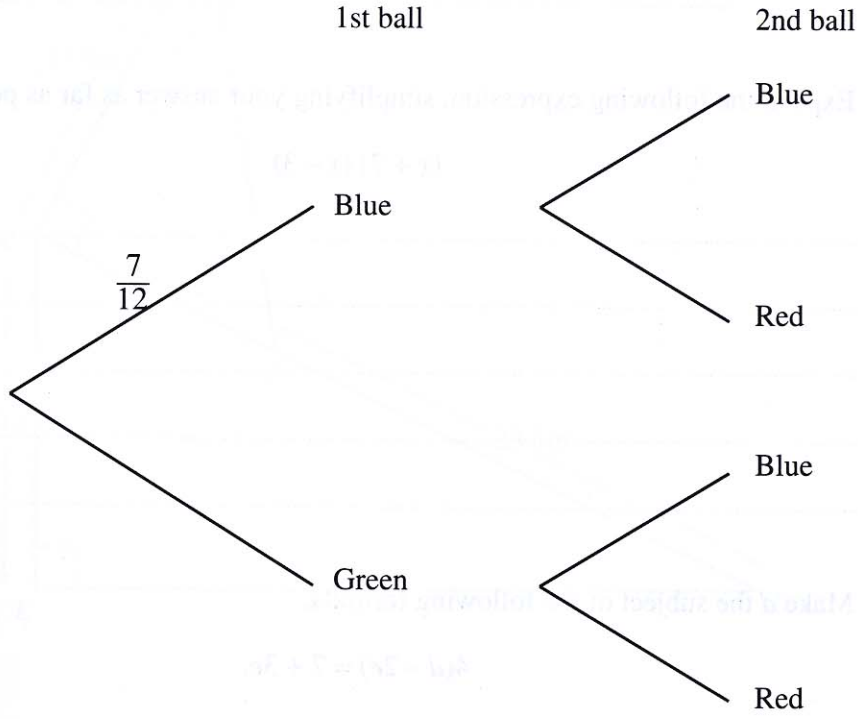
[2]

9. A bag contains 7 blue balls and 5 green balls. Another bag contains 4 blue balls and 6 red balls. A ball is drawn at random from the first bag and its colour is noted. A ball is then drawn at random from the second bag and its colour is noted.

(a) Complete the following tree diagram.



[2]

(b) Calculate the probability that both balls are blue.

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[2]

(c) Calculate the probability that at least one ball is blue.

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[2]

20. A bag contains coloured counters, 3 green, 4 blue, 1 yellow and 2 red.
Two counters are selected at random **without replacement** from the bag.
Calculate the probability that

(a) the two counters are both red,

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[2]

(b) exactly one of the counters is red.

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[3]