1 The 40 members of a club include Ranuf and Saed. All 40 members will travel to a concert. 35 members will travel in a coach and the other 5 will travel in a car. Ranuf will be in the coach and Saed will be in the car.

In how many ways can the members who will travel in the coach be chosen? [3]

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2 An ordinary fair die is thrown repeatedly until a 1 or a 6 is obtained.

(a) Find the probability that it takes at least 3 throws but no more than 5 throws to obtain a 1 or a 6. [3]

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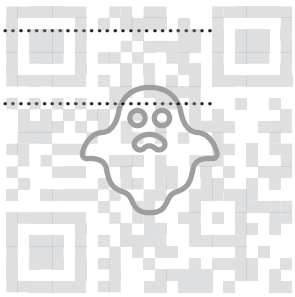

On another occasion, this die is thrown 3 times. The random variable X is the number of times that a 1 or a 6 is obtained.

(b) Draw up the probability distribution table for X. [3]

(c) Find E(X). [2]

3 The weights of apples of a certain variety are normally distributed with mean 82 grams. 22% of these apples have a weight greater than 87 grams.

(a) Find the standard deviation of the weights of these apples. [3]

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(b) Find the probability that the weight of a randomly chosen apple of this variety differs from the mean weight by less than 4 grams. [4]

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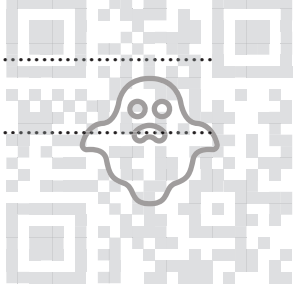

4 Richard has 3 blue candles, 2 red candles and 6 green candles. The candles are identical apart from their colours. He arranges the 11 candles in a line.

(a) Find the number of different arrangements of the 11 candles if there is a red candle at each end. [2]

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(b) Find the number of different arrangements of the 11 candles if all the blue candles are together and the red candles are not together. [4]

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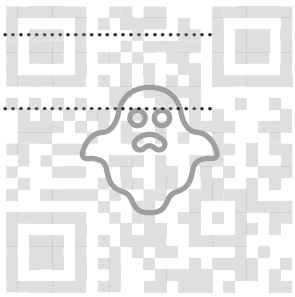


5 In Greenton, 70% of the adults own a car. A random sample of 8 adults from Greenton is chosen.

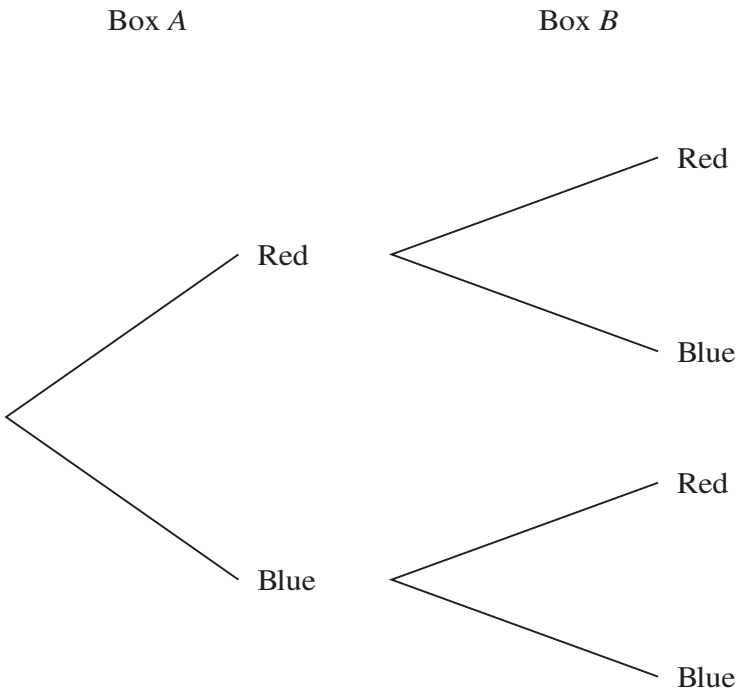
(a) Find the probability that the number of adults in this sample who own a car is less than 6. [3]

A random sample of 120 adults from Greenton is now chosen.

(b) Use an approximation to find the probability that more than 75 of them own a car. [5]

6 Box *A* contains 7 red balls and 1 blue ball. Box *B* contains 9 red balls and 5 blue balls. A ball is chosen at random from box *A* and placed in box *B*. A ball is then chosen at random from box *B*. The tree diagram below shows the possibilities for the colours of the balls chosen.

(a) Complete the tree diagram to show the probabilities. [3]



(b) Find the probability that the two balls chosen are not the same colour. [2]

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(c) Find the probability that the ball chosen from box A is blue given that the ball chosen from box B is blue. [4]

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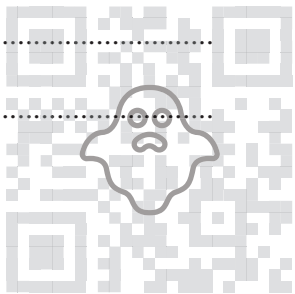
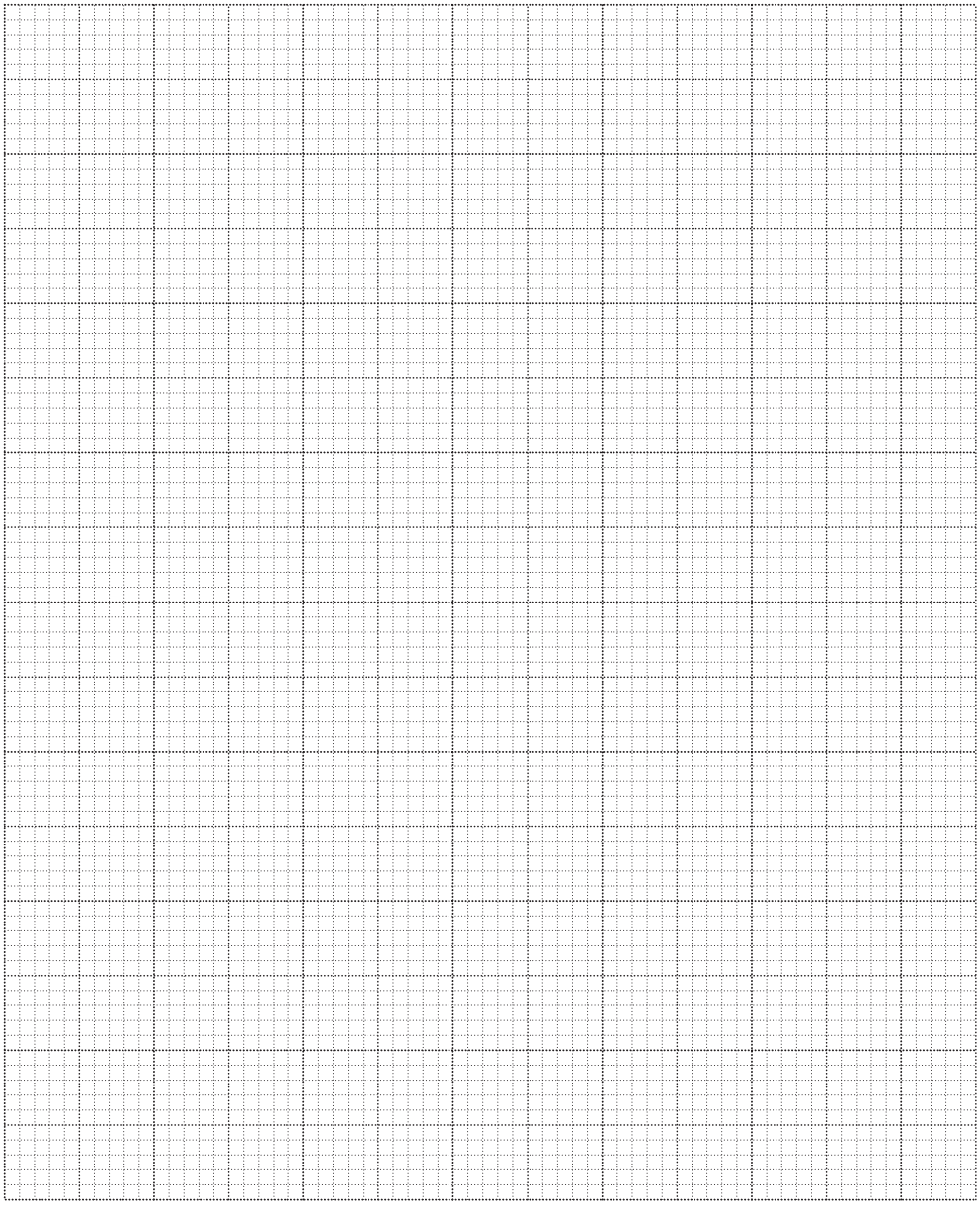


7 Helen measures the lengths of 150 fish of a certain species in a large pond. These lengths, correct to the nearest centimetre, are summarised in the following table.

Length (cm)	0 – 9	10 – 14	15 – 19	20 – 30
Frequency	15	48	66	21

(a) Draw a cumulative frequency graph to illustrate the data. [4]



(b) 40% of these fish have a length of d cm or more. Use your graph to estimate the value of d. [2]

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The mean length of these 150 fish is 15.295 cm.

(c) Calculate an estimate for the variance of the lengths of the fish. [3]

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