

Probability

Question Paper 2

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Probability
Sub Topic	
Booklet	Question Paper 2

Time Allowed: 59 minutes

Score: / 49

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

- 1 (a) In a sweet shop 5 identical packets of toffees, 4 identical packets of fruit gums and 9 identical packets of chocolates are arranged in a line on a shelf. Find the number of different arrangements of the packets that are possible if the packets of chocolates are kept together. [2]
- (b) Jessica buys 8 different packets of biscuits. She then chooses 4 of these packets.
- (i) How many different choices are possible if the order in which Jessica chooses the 4 packets is taken into account? [2]
- The 8 packets include 1 packet of chocolate biscuits and 1 packet of custard creams.
- (ii) How many different choices are possible if the order in which Jessica chooses the 4 packets is taken into account and the packet of chocolate biscuits and the packet of custard creams are both chosen? [3]
- (c) 9 different fruit pies are to be divided between 3 people so that each person gets an odd number of pies. Find the number of ways this can be done. [5]

- 2 Ronnie obtained data about the gross domestic product (GDP) and the birth rate for 170 countries. He classified each GDP and each birth rate as either 'low', 'medium' or 'high'. The table shows the number of countries in each category.

		Birth rate		
		Low	Medium	High
GDP	Low	3	5	45
	Medium	20	42	12
	High	35	8	0

One of these countries is chosen at random.

- (i) Find the probability that the country chosen has a medium GDP. [1]
- (ii) Find the probability that the country chosen has a low birth rate, given that it does not have a medium GDP. [2]
- (iii) State with a reason whether or not the events 'the country chosen has a high GDP' and 'the country chosen has a high birth rate' are exclusive. [2]

One country is chosen at random from those countries which have a medium GDP and then a different country is chosen at random from those which have a medium birth rate.

- (iv) Find the probability that both countries chosen have a medium GDP and a medium birth rate. [3]

- 3 When a butternut squash seed is sown the probability that it will germinate is 0.86, independently of any other seeds. A market gardener sows 250 of these seeds. Use a suitable approximation to find the probability that more than 210 germinate. [5]
- 4 Bag *A* contains 4 balls numbered 2, 4, 5, 8. Bag *B* contains 5 balls numbered 1, 3, 6, 8, 8. Bag *C* contains 7 balls numbered 2, 7, 8, 8, 8, 8, 9. One ball is selected at random from each bag.
- (i) Find the probability that exactly two of the selected balls have the same number. [5]
- (ii) Given that exactly two of the selected balls have the same number, find the probability that they are both numbered 2. [2]
- (iii) Event *X* is ‘exactly two of the selected balls have the same number’. Event *Y* is ‘the ball selected from bag *A* has number 2’. Showing your working, determine whether events *X* and *Y* are independent or not. [2]
- 5 A triangular spinner has one red side, one blue side and one green side. The red side is weighted so that the spinner is four times more likely to land on the red side than on the blue side. The green side is weighted so that the spinner is three times more likely to land on the green side than on the blue side.
- (i) Show that the probability that the spinner lands on the blue side is $\frac{1}{8}$. [1]
- (ii) The spinner is spun 3 times. Find the probability that it lands on a different coloured side each time. [3]
- (iii) The spinner is spun 136 times. Use a suitable approximation to find the probability that it lands on the blue side fewer than 20 times. [5]
- 6 In a group of 30 teenagers, 13 of the 18 males watch ‘Kops are Kids’ on television and 3 of the 12 females watch ‘Kops are Kids’.
- (i) Find the probability that a person chosen at random from the group is either female or watches ‘Kops are Kids’ or both. [4]
- (ii) Showing your working, determine whether the events ‘the person chosen is male’ and ‘the person chosen watches Kops are Kids’ are independent or not. [2]