

## Sec 4 Integrated Mathematics: Simple Probability Worksheet

- 1 (a) Two unbiased dice are thrown. Find the probability that they  
(i) show the same number, (ii) show the different numbers.  
(b) Three unbiased dice are thrown. Find the probability that  
(i) they all show different numbers, (ii) at least two show the same number. GCE "O" N02/1/16
- 2 The probability that Catherine oversleeps is 0.4. If she oversleeps, the probability that she cycles to school is 0.7. If she does not oversleep, the probability that she cycles to school is 0.1. Calculate the probability that Catherine cycles to school. GCE "O" J00/1/17
- 3 In this part of the question all probabilities should be given in exact decimals.  
The ticket machine in a car park takes 50 cent coins and \$1 coins. A ticket costs \$1.50.  
The probability that the machine will accept a particular 50 cent coin is 0.9 and that it will accept a particular \$1 coin is 0.8.  
(i) What is the probability that the machine will not accept a particular 50 cent coin?  
(ii) Leslie put one 50 cent coin and one \$1 coin into the machine. Calculate the probability that the machine will not accept both of these coins.  
(iii) Joan only has three 50 cent coins. Calculate the probability that  
(a) the machine will accept all three coins,  
(b) Joan will not get a ticket. GCE "O" N97/2/10
- 4 A bag contains a number of balls each one coloured either red or blue. A ball is chosen at random and then put back into the bag. This process is repeated several times.  
(a) The probability of choosing a red ball is  $r$ . Write down, in terms of  $r$ , the probability of choosing a blue ball.  
(b) Draw a *tree diagram* to show the possible outcomes and their probabilities when the process has been carried out twice.  
Expressing your answer in terms of  $r$ , find the probability that a red ball was chosen each time.  
(c) The process was carried out nine times. Find the probability that  
(i) a red ball was chosen every time, (ii) *at least one* blue ball was chosen. GCE "O" N97/2/10
- 5 The four faces of a red tetrahedral die are marked 1, 2, 2 and 3.  
The four faces of a blue tetrahedral die are marked 1, 2, 5 and 6.  
When such a die is thrown, the score is the number on the face on which it lands.  
The two dice are thrown together and their scores added.  
(i) Find the probability that the total score is 7.  
(ii) The faces of a green tetrahedral die are marked 10, 20, 30 and 40.  
All three dice are thrown together and the scores added.  
Find the probability that the total is more than 30 but less than 35. GCE "O" J95/1/21
- 6 There are three boxes each containing 2 red balls and 9 white balls, and all the balls are identical in colour. A ball is transferred from the first box to the second box, then a ball is transferred from the second box to the third box, and finally a ball is transferred from the third box to the first box. Find the probability that each box will contain 2 red balls and 9 white balls again.
- 7 A sample of 3 electric bulbs is taken at random from a pack of 10 and inspected. The whole pack is rejected if more than one of the bulbs inspected is found to be faulty. Find the probability that a pack with 3 faulty bulbs is accepted. GCE "O" AM, J87/2/17b

8 A packet contains a **large number** of flower seeds which look identical, but produce flowers with one of three colours, white, yellow or red. One half of the seeds produce white flowers and one third produce yellow flowers. The remainder of the seeds produce red flowers.

- (a) Explain why the probability that a particular seed will produce a red flower is  $\frac{1}{6}$ .
- (b) Find the probability that a particular seed will produce a flower that is not yellow.
- (c) Two seeds are planted. Find the probability that
- (i) both will produce a yellow flower,
  - (ii) both will produce a blue flower,
  - (iii) one will produce a yellow flower and the other a white flower,
  - (iv) neither will produce a red flower.

GCE "O" EM, N98/2/Q3

9 An examination is set every month.

John takes the examination each month until he passes.

Each time he takes the examination, the probability that he passes is 0.9.

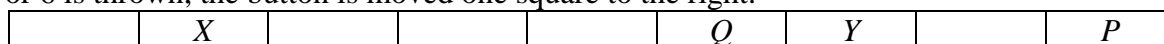
- (a) Find the probability that John
- (i) fails the first examination and passes the second,
  - (ii) passes the examination in either the first or second month,
  - (iii) fails the first three examinations,
  - (iv) passes the examination in one of the first four months.
- (b) (i) Find the probability, in terms of  $n$ , that John fails the first  $n$  examinations.  
(ii) Write down the probability that John passes the examination in one of the first  $n$  months.

GCE "O" EM, N01/1/24

10 The diagram shows a grid of squares. A button is placed on one of the squares. A fair die is thrown.

If 1, 2, 3, or 4 is thrown, the button is moved one square to the left.

If 5 or 6 is thrown, the button is moved one square to the right.



- (i) The button is placed on square  $X$ . The die is thrown once. What is the probability that the button is moved to the right?
- (ii) On another occasion the button is placed on square  $Y$ . The die is thrown once and the button is moved. The die is thrown a second time and the button is moved again. Find the probability that the button finishes at  $P$  or  $Q$  or  $Y$ .

GCE "O" EM, J98/2/6a

11 A box contains  $B$  number of black chocolates and  $W$  number of white chocolates.

A chocolate is randomly selected, its colour noted, and then returned to the box. Additional  $N$  number of chocolates of the same colour as the one selected are added to the box. Then a second chocolate is selected at random. Find the probability, in terms of  $B$ ,  $W$  and  $N$ , that the second chocolate is a black chocolate. Leave your answer in the simplest form.

12 A solid cube measuring 4 cm on a side is painted on its six faces. It is cut into 64 identical cubes. One of the smaller cubes is chosen at random and tossed to land on a horizontal surface. Find the probability that none of the five faces that are visible is painted.

NCTM calendar Problem

13 Three girls  $A$ ,  $B$  and  $C$  are each given a bag containing six numbered marbles as shown in the diagram. Each person removes one marble at random from her bag.

			<b>A</b>			
<b>3</b>	<b>3</b>	<b>3</b>				
<b>3</b>	<b>0</b>	<b>6</b>				

			<b>B</b>			
<b>2</b>	<b>2</b>	<b>2</b>				
<b>2</b>	<b>5</b>	<b>5</b>				

			<b>C</b>			
<b>1</b>	<b>1</b>	<b>1</b>				
<b>4</b>	<b>4</b>	<b>7</b>				

- (i) Calculate the probability that  $B$  draws a higher number than  $C$ .
- (ii) Calculate the probability that  $A$  draws a higher number than both  $B$  and  $C$ .

GCE "O" AM, N78/1/24