

# WORKSHEET #3: PROBABILITY

1. A bag contains 4 red discs, 10 white discs and 6 blue discs.

Two discs are selected at random from the bag one at a time **with replacement**.

(a) Draw a tree diagram on the problem described.

(b) Find the probability of the selecting

- (i) a red disc and a blue disc next
- (ii) a red disc and a blue disc
- (iii) two discs of the same colour
- (iv) two discs of different colour

2. A bag contains 8 ten-cent coins, 10 fifty-cent coins and  $x$  one-dollar coins.

A coin is drawn at random.

(a) If the probability of drawing a ten-cent coin is  $\frac{2}{5}$ , find the value of  $x$  and write down the total number of coins in the bag.

(b) Two coins are drawn at random from the bag one at a time without replacement. Find the probability of drawing:

- (i) 2 ten-cent coins
- (ii) 2 coins that add up to at least \$1.50

3. Each time Christina throws a ball at a target, the probability that she hits the target is  $\frac{1}{3}$ . She throws the ball three times.

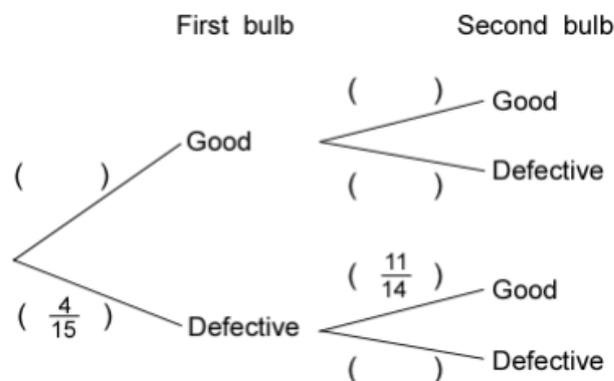
Find the probability that she hits the target

- (i) 3 times
- (ii) at least once.

4. A box contains 15 electric light bulbs, 4 of which are defective.

Peter chooses two bulbs at random from the box, one after the other.

(a) Complete the tree diagram below:



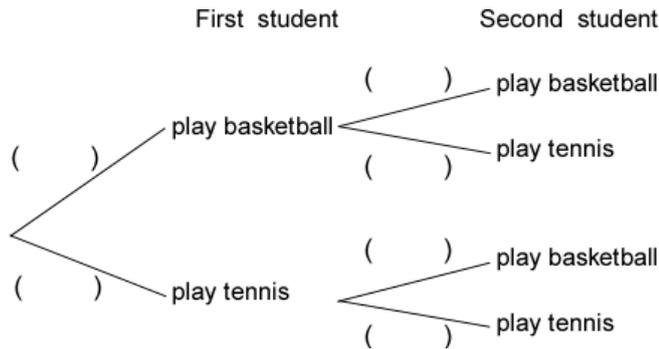
(b) Find the probability that

- (i) the first bulb is good and the second is defective,
- (ii) both bulbs are good,
- (iii) neither bulb is good,
- (iv) one bulb is defective.



10. Among a group of 20 students, 14 of them can play only basketball and 6 of them can play only tennis. Mr Seah, a PE teacher, selects two students at random from the group, one after the other.

(a) Complete the tree diagram below: [2]



(b) Find the probability that

- (i) the first student plays tennis and the second plays basketball, [1]
- (ii) at most one of the students plays tennis, [2]
- (iii) the second student selected plays basketball. [1]

11. Suppose a bag contains 20 sweets, of which 7 are toffees wrapped in green paper, 4 are barley sugar wrapped in red paper, 3 are toffees wrapped in red paper, and 6 are barley sugar wrapped in green paper. If two sweets are selected at random, one after the other,

Draw the tree diagram completely [3]  
 Calculate the probability that

- (a) the first sweet is toffee and the second sweet is barley sugar wrapped in red paper, [1]
- (b) both sweets are toffees, [1]
- (c) both sweets are barley sugar wrapped in green paper, [1]
- (d) both sweets are of the same flavour, [2]
- (e) the two sweets are wrapped in paper of different colours. [2]

12. A box contains 4 red balls and 3 green balls. One ball is picked at random. If it is green, then it is not replaced in the box. If it is red, then it is replaced. A second ball is then drawn from the box.

(a) Construct the probability tree diagram. [3]  
 (b) Find the probability that

- (i) both balls are green, [1]
- (ii) the balls are of different colours, [2]
- (iii) at least 2 green balls are left in the box after the second draw. [2]

13. There are 24 white marbles,  $x$  red marbles and  $y$  blue marbles in a box. One marble is drawn at random. Given the probability that a red marble is  $1/5$  and that a blue marble is drawn is  $2/5$ :

(a) calculate the values of  $x$  and  $y$ . [3]

(b) With these values, calculate the probability that two marbles drawn in a succession without replacement are:

(i) of the same colour [2]

(ii) at least one is red. [2]

(iii) A white marble followed by a red marble. [1]

14. Paula and Tarek take part in a quiz.

The probability that Paula thinks she knows the answer to any questions is 0.6.

If Paula thinks she knows, the probability that she is correct is 0.9.

Otherwise, she guesses and the probability that she is correct is 0.2.

(a) Construct a tree diagram. [3]

(b) Find the probability that Paula

(i) thinks she knows the answer and is correct, [1]

(ii) gets the correct answer. [2]