QUESTION 1 A card is drawn at random from a normal pack of 52 cards. Find the probability that the card is:

a a club 1/4 b a black card 1/2 c an ace 4/52 = 1/13

d not a spade 3/4 e a black ace 2/52 = 1/26 f a red card 1/2

QUESTION 2 From the letters of the word 'CHANCE', one letter is selected at random. What is the probability that the letter is:

a a vowel? 2/6 = 1/3 b a consonant? 2/3 c the letter C? 2/6 = 1/3

QUESTION 3 A die is thrown once. Find the probability that the number is:

a a five 1/6 b an odd number 3/6 = 1/2

c a number greater than 2 4/6 = 2/3 d zero 0

e a prime number (2,3,5) 3/6 = 1/2 f a square number 2/6 = 1/3 (only 4 and 1)

QUESTION 4 A bag contains 6 yellow, 4 blue and 5 red balls. If a ball is drawn at random, find the probability that it is: total = 15 balls.

a yellow 6/15 b red 5/15 = 1/3 c blue 4/15

d not yellow 9/15 = 3/5 e white 0 f either blue or red 9/15 = 3/5

QUESTION 5 A three-digit number is to be formed from the digits 1, 5 and 9, written on three separate cards. What is the probability that the number:

a formed is even? 0 b is odd? 1

c is less than 500? 1/3 d is divisible by 3? 1+5+9 = 15 so any numbers created is divisible by 3. So 1

e is divisible by 5? 1/3 (finishes by 5) f is greater than 100? 2/3

QUESTION 6 The numbers 1 to 7 are written on separate cards. One card is chosen at random. What is the probability that:

a the number is odd? 4/7 b the number is even? 3/7

c it is 6? 1/7 d it is zero? 0

e it is a prime number? (2,3,5,7) 4/7 f it is divisible by 3? (only 3 and 6) so 2/7

11 letters

QUESTION 7 A letter is chosen from the word 'PROBABILITY'. What is the probability that the letter is:

a a vowel? 5/11 b a consonant? 6/11 c the letter B? 2/11

d the letter P or B? 3/11 e the letter M? 0 f the letter Y? 1/11

Vowels are taken to be A, E, I, O, U, Y (too)

QUESTION 1 A bag contains 4 white marbles and 1 black marble. If one marble is drawn out at random, what is the probability, as a decimal, that it is:

a black 1/5 **b** white 4/5 **c** yellow 0

QUESTION 2 A raffle ticket is drawn from a box containing 100 tickets numbered from 1 to 100. Find the percentage chance that the number of the ticket is:

a divisible by 10 10% **b** less than 10 9%

c greater than 10 90% **d** a multiple of 5 20%

e greater than 90 10% **f** a number containing the digit 9 19%

QUESTION 3 A spinner used in a game is in the shape of a pentagon, and has an equal chance of landing on any of its sides. The sides are numbered 1, 2, 3, 4 and 5. What is the probability, as a percentage, that the spinner lands on:

a 2 20% **b** an odd number 60%

QUESTION 4 The internal phone numbers at a factory have three digits.

a How many phone numbers are possible? 1000

b If the numbers are allocated at random, what is the probability, as a decimal, that Lucas has a phone number that ends in 5? 0.1

QUESTION 5 A bag holds 9 blue, 6 red and 3 yellow golf tees. If a tee is selected at random from the bag at random, what is the probability, (as a fraction in simplest form), that the tee is:

a blue 1/2 **b** red 1/3 **c** yellow 1/6

d red or blue 5/6 **e** green 0 **f** red, yellow or blue 1

QUESTION 6 Complete:

The probability of any event is always in the range from 0 to 1 .

Question 1 A die is rolled. What is the probability of:

a not getting a 6 5/6

b not getting a 3 5/6

c not getting a 4 or 5 2/3

d not getting an even number 1/2

Question 2 From a pack of 52 playing cards one card is drawn at random. What is the probability that it is not a club?

3/4

Question 3 The probability of winning a competition is $\frac{1}{500}$. What is the probability of losing?

499/500

Question 4 A coin is tossed once. What is the probability that the result is:

a not a head 1/2

b neither a head nor a tail 0

c either a head or a tail 1

Question 5 The probability of a train arriving on time is $\frac{19}{32}$. What is the probability that it will not arrive on time?

13/32

Question 6 The probability of it raining today is $\frac{1}{5}$. What is the probability of it not raining today?

4/5

Question 7 A bag holds only two-dollar coins. If a coin is selected at random from the bag, what is the probability that it is not a two-dollar coin.

0

Question 8 There is a 27% chance of winning a game. What is the probability of not winning the game?

73%

Question 9 The probability of a baby being born with a particular defect is 0.005. What is the probability of the baby being born without that defect?

0.995

Question 10 As the result of an experiment it is determined that the chance that any motorist at a particular location is exceeding the speed limit is 1 in 5. If a motorist at that location is randomly selected, what is the probability that she or he is travelling at, or less than, the speed limit?

4 in 5

3 A company produces boxes of individually wrapped chocolates. They intend each box to have 30 chocolates but suspect that the packing process is not entirely accurate, so they conduct a random sample of 100 boxes and check the contents. The table shows the results obtained.

Number of chocolates	28	29	30	31
Number of boxes	3	15	72	10

a What is the probability of buying a box with:

i the correct number of chocolates? $72/100 = 18/25$

ii more than 30 chocolates? $10/100 = 1/10$

iii fewer chocolates than intended? $18/100 = 9/50$

b Do you consider that this situation is fair to the purchaser? unfair as it is more likely to get less than more chocolates

4 Kevin has a set of cards labelled 1, 2, 3, …, 10, and conducts an experiment in which he draws one card at random. Consider the following events.

$A = \{ 2, 4, 6, 8, 10 \}$ = an even card is drawn

$B = \{ 1, 3, 5, 7, 9 \}$ = an odd card is drawn

$C = \{ 2, 3, 5, 7 \}$ = a prime number is drawn

$D = \{ 5, 6, 7, 8, 9, 10 \}$ = a number greater than 4

$E = \{ 8, 9, 10 \}$ = a number greater than 7

$F = \{ 1, 2, 3, 4 \}$ = a number less than 5

a Name any pairs of:

i complementary events

A and B

F and D

ii mutually exclusive events

A and B D and F

C and E E and F

b Find the probability of each event.

$p(A) = \frac{5}{10} = \frac{1}{2}$ $p(B) = \frac{5}{10} = \frac{1}{2}$ $p(C) = \frac{4}{10} = \frac{2}{5}$ $p(D) = \frac{6}{10} = \frac{3}{5}$ $p(E) = \frac{3}{10}$

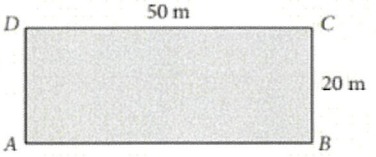
$p(F) = \frac{4}{10} = \frac{2}{5}$

22 A horse is grazing inside an enclosed rectangular paddock 50 m by 20 m and is free to move anywhere inside the paddock. Assuming that the horse's position is random, what is the probability that at any given time the horse is:

(a) more than 5 m from the fence

(b) less than 5 m from the fence

(c) not more than 5 m from a corner?

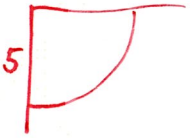


a) Area more than 5 m from fence $= 10 \times 40 = 400\ m^2$

TOTAL area $= 50 \times 20 = 1000\ m^2$

So $p(a) = \frac{400}{1,000} = \frac{4}{10} = \frac{2}{5}$

b) $p(b) = 1 - p(a) = 1 - \frac{2}{5} = \frac{3}{5}$

c) 

Area less than 5 m from corner $= 4 \times \frac{\pi 5^2}{4} = \pi 5^2 = 25\pi$

So $p(c) = 25\pi/1,000 = \frac{\pi}{40} \simeq 0.08$ or $\simeq 8\%$