

Probability

Example .

**A die (dice) has the numbers 1 2 3 4 5 6 on it.**

When it is thrown,

- (a) what is the probability of throwing an odd number ?
- (b) if the die is thrown 70 times, how many times would you expect an odd number ?

Answer :

- (a) There are 3 odd numbers out of 6 ( 1, 3 and 5 )

1 2 3 4 5 6

So probability (odd number ) =  $3/6 = 1/2$

- (b) Expect  $1/2 \times 70 = 35$

- 1 (a) what is the probability of throwing an even number ?
- (b) if the die is thrown 60 times, how many times would you expect an even number ?

- 2 (a) what is the probability of throwing a prime number ?
- (b) if the die is thrown 70 times, how many times would you expect a prime number ?

Clue : prime numbers  
2, 3, 5, 7, 11, .....

- 3 (a) what is the probability of throwing a number bigger than 5?
- (b) if the die is thrown 42 times, how many times would you expect a number bigger than 5?

- 4 (a) what is the probability of throwing a number less than 3?
- (b) if the die is thrown 90 times, how many times would you expect a number less than 3 ?

In these questions which follow, a 10 sided dice has the numbers 1 to 10 on the sides.

- 5 (a) what is the probability of throwing an odd number ?
- (b) if the die is thrown 20 times, how many times would you expect an odd number ?

- 6 (a) what is the probability of throwing a multiple of 3 ?
- (b) if the die is thrown 50 times, how many times would you expect a multiple of 3 ?

Clue : multiples of 3  
3, 6, 9, 12, .....

- 7 (a) what is the probability of throwing a number less than 5 ?
- (b) if the die is thrown 100 times, how many times would you expect a number less than 5 ?

- 8 (a) what is the probability of throwing a multiple of 5 ?  
 (b) if the die is thrown 120 times, how many times would you expect a multiple of 5 ?
- 9 (a) what is the probability of throwing a square number ?  
 (b) if the die is thrown 30 times, how many times would you expect a square number ?
- 10 (a) what is the probability of throwing a factor of 16 ?  
 (b) if the die is thrown 3000 times, how many times would you expect an odd number ?

Clue ; square numbers  
 1, 4, 9, 16, 25, ...

In a pack of Playing cards there are 52 cards (+ 2 jokers IGNORE)  
 There are 4 different suits : 2 RED Diamonds and Hearts  
 2 BLACK Spades and Clubs  
 There are 13 cards in each suit  
 In each suit : ACE, 2, 3, 4, 5, 6, 7, 8, 9, 10, JACK, QUEEN, KING

A card is chosen at random. What is the probability of choosing

- 11 An Ace  
 12 A black Queen  
 13 A red card  
 14 A red or black card  
 15 The 5 of Clubs  
 16 A Diamond or a Heart  
 17 Any King  
 18 A King or a Queen of a Jack  
 19 A BLUE suit  
 20 A card with the number 9

21 In a College class the colour of hair of the students is noted..

Brown	11
Black	9
Blonde	8
Brunette	2

What is the probability that if s student was chosen at random they would have Blonde hair?

**Give your answer as a decimal correct to 2-decimal places.**

22 The probability of a train arriving late is  $\frac{1}{5}$

- (a) What is the probability of it arriving on time ?  
 (b) The train arrives at the station 20 times over the weekend  
 How many times would you expect it to be on time ?

23 The ages of a group of builders were as follows:

36    19    33    25    37    33    21    34  
 34    47    33    18    34    32    34    35

What is the probability that a builder chosen at random will be more than 25 years old?

**Give your answer as a decimal fraction.**

24 There are 5 white, 9 green and 7 red balls in a bag.

(a) If a ball is taken at random from the bag what is the probability that the ball is white?

(b) The ball drawn was white and **is not replaced** in the bag.

A second ball is now taken from the bag.

What is the probability that this second bead is **not** white?

**Give your answer as a fraction in its simplest form.**

25 Amazon Books offers 3 kindle book Deals for £50 as shown below :

Deal 1 :	4 Horror, 5 Romance , 7 Suspense and 4 Comedy.
Deal 2 :	3 Thriller, 4 Biography, 5 Comedy and 8 Sci-Fi
Deal 3 :	2 Suspense, 4 Comedy, 6 Horror and 8 Biography.

(a) If Pauline chooses a Deal at random, what would be the probability of her choosing a deal with 4 Comedy books ?

(b) What is the probability of choosing a Deal containing more Thriller books than Biography books ?

26 A survey is taken of how 100 pupils travel to school.

The results are shown in the table.

(i) What is the probability that a pupil chosen at random cycles to school ?

(ii) 4 pupils who normally travel by bus are transferred. What is the probability that a pupil now chosen at random goes by car to school ?

Transport	Number of pupils
Bus	36
Cycle	9
Walk.	31
Car	24

Example .

In a box there is a mixture of milk and plain chocolates.

There are 20 plain chocolates and the remainder are milk chocolates.

The probability that a chocolate chosen at random from the box is a milk one is  $\frac{3}{8}$

How many chocolates, in total, are in the box?

Answer :

$\frac{3}{8}$  are milk

So  $\frac{5}{8}$  are plain = 20 chocolates

So  $\frac{1}{8}$  =  $20 \div 5 = 4$

$\frac{8}{8}$  =  $4 \times 8 = 32$

There are 32 chocolates in the box.

27. In a box there is a mixture of red and green counters.

There are 40 red counters and the remainder are green counters.

The probability that a counter chosen at random from the box is a green one is  $\frac{3}{8}$

How many counters, in total, are in the box?

28 On a bus there is a mixture of Scottish and English students..

There are 55 Scottish students and the remainder are English students

The probability that a student chosen at random is Scottish is  $\frac{5}{6}$

How many students, in total, are on the bus?

29 In a crate of fruit there is a mixture of apples and oranges.

There are 45 apples and the remainder are oranges.

The probability that an orange is chosen at random from the crate is  $\frac{2}{5}$

How many pieces of fruit, in total, are in the box?

30 There is a mixture of magazines and comics on a library shelf..

There are 36 comics and the remainder are magazines.

The probability that a magazine is chosen at random from the shelf rather than a comic  $\frac{5}{8}$

What is the total number of magazines and comics on the shelf?

Example .

A charity lottery consists of a draw from a set of 40 balls numbered from 1 to 40.

- (a) What is the probability that the first ball drawn has a number greater than 30?

In the draw five numbered balls are drawn and not replaced.

- (b) What is the probability of the number 7 being drawn as the fifth ball if it was not drawn in the first four?

Answer :

- (a) There are 10 balls greater than 30  
So probability is  $10/40 = \frac{1}{4}$

- (b) By the time you get to the fifth ball, 4 have already been removed.  
This leaves 36 balls.  
So the probability of choosing the number 7 as the fifth ball is  $1/36$

31.

A charity lottery consists of a draw from a set of 50 balls numbered from 1 to 50.

- (a) What is the probability that the first ball drawn has a number greater than 35?

In the draw five numbered balls are drawn and not replaced.

- (b) What is the probability of the number 12 being drawn as the fifth ball if it was not drawn in the first four?

32

A charity lottery consists of a draw from a set of 60 balls numbered from 1 to 60.

- (a) What is the probability that the first ball drawn has a number less than 11?

In the draw three numbered balls are drawn and not replaced.

- (b) What is the probability of the number 21 being drawn as the third ball if it was not drawn in the first two?

Mrs McLaughlin  
Mr Mailley

