Lesson 6

GCSE Mathematics
Probability

6.1 It's not fair ! (Homework)

An tetrahedral (four sided) die is rolled 200 times.

What is expected ?

Here are the rolls, with rolls of 4 missed out.

2	3	3	2	1	3	3	1	2	3
1	1	3	3	2	1	3	3	3	1
1	2	1	1	3	1	2	1	1	3
3	3	1	2	3	1	3	3	1	2
3	1	2	1	3	2	1	3	1	1

Table of the experiment's frequencies.

Roll	1	2	3	4
Frequency				

Table of the experiment's probabilities.

Roll	1	2	3	4
Probability (%)				

What can you say about this tetrahedral die ?

6.2 Exercise

Question 1

Each of these groups of numbers adds up to 100%.
In each case determine the value of x

(i)	45%	20%	5%	x%
(ii)	30%	10%	x%	20%
(iii)	x%	25%	40%	15%
(iv)	15%	15%	40%	2x%
(v)	35%	7x%	20%	10%
(vi)	5%	15%	0.5x%	45%
(vii)	x%	44%	36%	x%
(viii)	42%	20%	28%	10x%
(ix)	14%	(x + 25)%	7%	9%
(x)	32%	2.5x%	44%	14%
(xi)	5x%	15%	30%	6x%
(xii)	18%	50%	0.25x%	16%

Question 2

A *biased* die rolls scores of 1, 2, 3, 4, 5, 6 with these percentage probabilities;

Score	1	2	3	4	5	6
Probability (%)	10	30	10	20	10	*x*

State the percentage probability that the score obtained is a

(i) 5

(ii) an odd number

(iii) 3 *or* 4

(iv) 6

(v) not 2

Question 3

A traffic light can show red, amber or green.
A certain traffic light is red 65% of the time.
It is amber for 5% of the time.

What is the percentage probability that a car, arriving at the light at random, finds it showing green ?

Question 4

Tomorrow night Jenny will do one of three things.

- ◇ go to the theatre
- ◇ visit her grandma's house
- ◇ stay at home

(i) Complete the following table:

Activity	Theatre	Grandma	Stay home
Probability	25%	35%	

(ii) Which of the three things is Jenny most likely to do ?

Question 5

When Shrewsbury Town football club play they can win, draw or lose.
The percentage probability that they will WIN a match is 24%.
The percentage probability that they will DRAW a match is 48%.

(i) Complete the following table:

Result	Win	Draw	Lose
Probability			

(ii) Find the probability that, in a randomly chosen game:

(a) Shrewsbury Town FC lose.

(b) Shrewsbury Town FC draw or lose.

Question 6

When Matthew plays chess he can win, draw or lose.
The percentage probability that they will WIN a match is 69%.
The percentage probability that they will DRAW a match is 13%.

(i) Complete the following table:

Result	Win	Draw	Lose
Probability			

(ii) Find the probability that, in a randomly chosen game:

(a) Matthew will lose.

(b) Matthew will NOT win.

Question 7

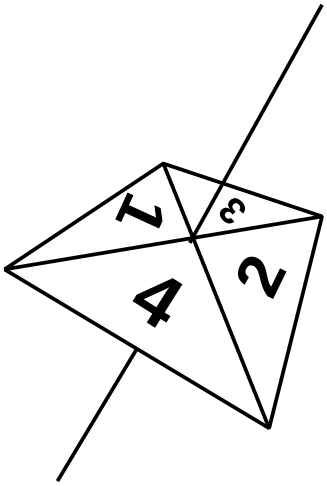
Each of these groups of numbers adds up to 1.

In each case determine the value of x

(i)	0.2	0.1	0.3	x
(ii)	x	0.1	0.1	0.1
(iii)	0.15	0.15	x	0.25
(iv)	0.1	0.1	0.2	$2x$
(v)	0.25	$5x$	0.15	0.1
(vi)	0.05	0.25	0.25	x
(vii)	0.1	x	0.15	0.1
(viii)	$3x$	0.10	0.45	$6x$
(ix)	0.24	$0.5x$	0.24	0.12
(x)	0.14	0.44	0.32	x
(xi)	0.05	0.25	$11x$	0.15
(xii)	0.18	0.5	0.16	x

Question 8

Here is a four sided spinner.



Its sides are labelled 1, 2, 3 and 4.

The spinner is biased.

The probability that the spinner lands on each of the numbers 1, 2 and 3 is given in the following table.

Number	Probability
1	0.25
2	0.25
3	0.1
4	

The spinner is spun once.

(a) Work out the probability that the spinner lands on 4.

(b) Work out the probability that the spinner lands on either 2 or 3.

Question 9

Four types of bird visit my garden.
The four types of bird are not equally likely to be seen.
The table shows the *decimal* probability that a randomly observed bird is of a particular type.

Type of bird	Blackbird	Sparrow	Starling	Robin
Probability (decimal)	0.35	0.25		0.15

(i) Complete the probability table.

(ii) Which type of bird is the most common in my garden ?

A bird is observed at random.
State the *decimal* probability that:

(iii) it is NOT a blackbird

(iv) it is a sparrow or a starling.

Question 10

A spinner can land on red or blue or yellow.
The spinner is biased.
The probability that it will land on red is 0.5
The probability that it will land on blue is 0.2

(a) Imad spins the spinner once.
Work out the probability that it will land on yellow.

(b) Janet spins the spinner 30 times.
Work out an estimate for the number of times the spinner will land on blue.

Question 11

Four girls run in a race.

The table shows the probability that each of three girls will win the race.

Name	Probability
Angela	0.5
Beverly	0.1
Caris	0.3
Danielle	

Calculate the probability that either Caris or Danielle will win the race.

Question 12

A *biased* die rolls scores of 1, 2, 3, 4, 5, 6 with these percentage probabilities;

Score	1	2	3	4	5	6
Probability (%)	5	15	10	x	20	y

The probability of rolling a 3 is the same as the probability of rolling a 6.

State the percentage probability that the score obtained is a

(i) 5

(ii) an odd number

(iii) 4 *or* 6

(iv) 4

(v) not 1

Question 13

For years Robert uses a tetrahedral (four faced) die to decide if he should;

- ◇ go to the **Cinema**
- ◇ walk the **Dog**
- ◇ dine out : **Pizza**
- ◇ go ten pin **Bowling**

However, he thinks the die may be *biased* (not fair) and so rolls it 50 times.
Here are the results with the Bowling scores missed out.

Dog	Cinema	Dog	Dog	Dog
Pizza	Dog	Cinema	Pizza	Dog
Dog	Dog	Dog	Dog	Pizza
Cinema	Pizza	Dog	Dog	Dog
Dog	Pizza	Dog	Cinema	Cinema

Complete the following tables;

Table of the experiment's frequencies.

Roll	Cinema	Dog	Pizza	Bowling
Frequency				

Table of the experiment's probabilities.

Roll	Cinema	Dog	Pizza	Bowling
Probability (%)				

What can you say about this tetrahedral die ?

Question 14

Alexei has a tin of crayons.
Each crayon is either red or blue or yellow or green.
The number of yellow crayons is the same as the number of green crayons.
Alexei chooses a crayon at random from the tin.

The probability that he chooses a red crayon is 0.3

The probability he chooses a blue crayon is 0.4

Find the probability that the crayon is;

(i) red or blue

(ii) yellow or green

(iii) green