Name:_____ Maths Group: _____ Tutor Set: _____

Unit 3 – Probability

Homework Booklet
KS3 Levels 3-8

Complete this table indicating the homework you have been set and when it is due by.

Date	Homework	Due By	Handed In

Please take care of the booklet as you will be required to make a donation to replace it if lost or damaged beyond use.

U3 – Probability
Introducing Probability – The probability Scale
No Calculator Allowed

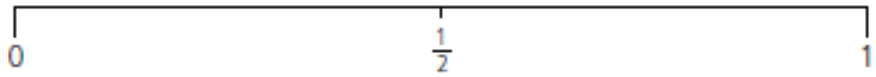
Section A For each question say whether you think the event is certain, likely, even, unlikely or impossible. 1) If I jump up in the air, I will land back on the ground. _____ 2) Tomorrow I will be 16 years old _____ 3) When I throw a coin it will land on "heads". _____ 4) This weekend an ice-cream will be eaten in Blackpool. _____ 5) Manchester City will win 150 matches this year. _____	Level 3-4
Section B Write one event relevant to you for each of the following. Certain: Likely: Evens: Unlikely: Impossible:	Level 3-4

Section C

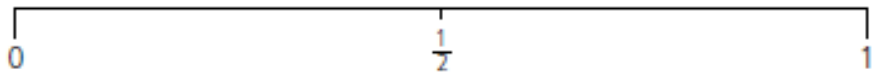
Level 4

Show the probaility of the following events on their probability scale usnig an arrow:

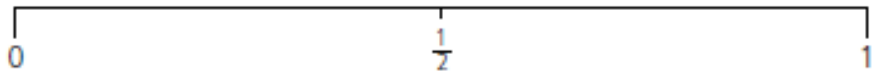
1 Throwing a six-sided die and getting an even number.



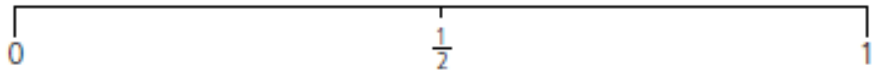
2 Throwing a six-sided die and getting an 8.



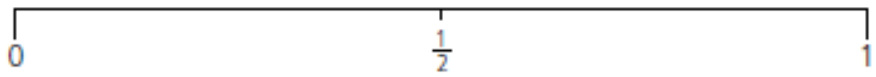
3 Tossing a coin and the coin landing on its edge.



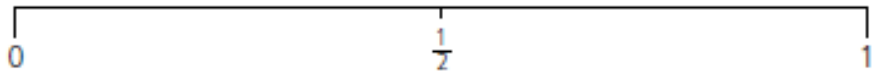
4 Throwing a six-sided die and getting more than 1.



5 Tossing a coin and getting a head.



6 Throwing a six-sided die and getting a 4.

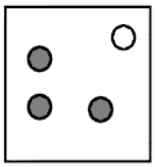


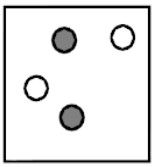
U3 – Probability
Finding Probabilities
No Calculator Allowed

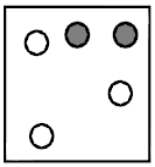
Section A — Level 4

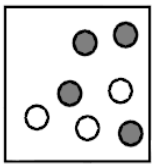
Counters are placed in a box. For each of the following boxes, use a fraction to show the probability of taking a black counter out of the box.

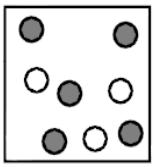
Boxes:

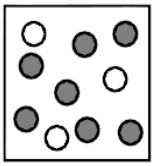
a). 

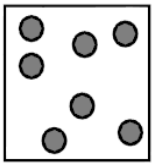
b). 

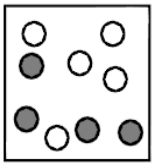
c). 

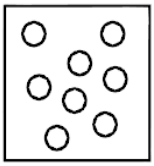
d). 

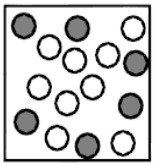
e). 

f). 

g). 

h). 

i). 

j). 

Answers:

a) _____ b) _____ c) _____ d) _____ e) _____

f) _____ g) _____ h) _____ i) _____ j) _____

Section B — Level 4

In a class of thirty pupils 8 play hockey, 10 play football, 4 play rugby and 8 go swimming. If a pupil is selected at random, what is the probability that the pupil will:

a) Play football _____

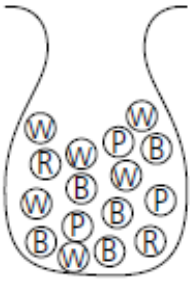
b) Play hockey or swim _____

c) play hockey or football _____

d) **not** play rugby _____

e) **not** swim _____

f) **not** play rugby or swim _____

A bag contains 6 white discs, 3 pink discs, 5 blue discs and 2 red discs.  What is the probability of choosing: a a white disc? b a red disc? c a red or a pink disc? d a white or a pink or a blue disc? e a yellow disc? f a white or a pink or a blue or a red disc? g a red or a blue or a white disc? h a red or a blue disc?	Level 4
If the probability of team winning their game of basket ball is $^{12}/_{17}$ what is the probability of them not winning? Explain the quickest way of working this out.	Level 5

U3 – Probability
Experimental Probability
No Calculator Allowed

<table>
<tr>
<td>For which of the following would you need to carry out an experiment to find the probabilities, circle those which need an experiment.

Toast landing butter side up

Winning the lottery

Throwing a 6 on a dice

James beating Paul at snooker

Picking a blue ball out of a bag With 4 red and 3 blue balls in

The probability of a football team winning, losing or drawing

Drawing pin landing

Throwing a heads with a coin</td>
<td>Level 5</td>
</tr>
<tr>
<td>Sarah recorded the colours of 200 cars.
The table shows the results:

<table><tr><td>Colour</td><td>White</td><td>Red</td><td>Blue</td><td>Green</td></tr><tr><td>Frequency</td><td>76</td><td>82</td><td>17</td><td>25</td></tr></table>
Use these results to estimate the probability of the next car being

a) White

b) Red

c) Blue

d) Green

Don’t forget to convert your answer to a decimal.</td>
<td>Level 5</td>
</tr>
</table>

U3 – Probability
Sample Space Diagrams
No Calculator Allowed

Section A — Level 5-6

1. List all the outcome of flipping two coins simultaneously.

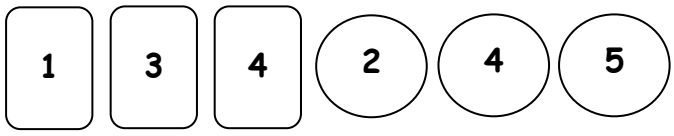
2. Two dice are rolled and their score is added together, copy and complete the sample space diagram to show all of the possible outcomes.

	1	2	3	4	5	6
1						
2	3					
3			6			
4						
5		7				
6						12

3. The sample space diagram you have just drawn shows the 36 outcomes of rolling two dice. Work out the following probabilities:
   i) Rolling a total of 6. _____
   ii) Rolling a total of 3. _____
   iii) Rolling a total that is even. _____

Section B — Level 5-6

3. Three cards are numbered 1, 3 and 4.
   Three discs are numbered 2, 4 and 5.



A game consists of picking one card at random and one disc at random.
The numbers on the card and disc are added together.

(i) Complete the table to show all the possible totals.

		Disc		
		2	4	5
Card	1	3		
	3			
	4			

(ii) What is the probability of getting a total which is an even number? _____

(iii) What is the probability of getting a total greater than 7? _____

U4 - Probability
Finding Probabilities
No Calculator Allowed

Section A	Level 5-6

1) A fair dice is rolled, work out the following probabilities:

a) Rolling a 6. _____

b) Rolling an even number. _____

c) Rolling a number greater than 4. _____

d) Rolling a number 7. _____

2) A fair coin is flipped, work out the following probabilities.

a) Getting a Head. _____

b) Getting a Tail. _____

c) What do you notice about these two probabilities? _____

3) There is a bag with 3 yellow counters, 4 blue counters and 2 red counters. If one counter is taken from the bag at random, what is the probability that:

a) a blue counter is picked. _____

b) a red counter is picked. _____

c) a yellow counter is picked. _____

d) What do you notice about these three probabilities? _____

e) What is the probability of getting a green counter? _____

Section B

Level 5-6

Brightlite company makes light bulbs.

They state of the company's machines can be 'available for use and being used' or 'available for use but not needed' or 'broken down'.

(a) The table shows the probabilities of the state of the machines in July 1994.
Write in the missing probability.

State of machines: July 1994	Probability
Available for use, being used	
Available for use, not needed	0.09
Broken down	0.03

(b) During another month the probability of a machine being available for use was 0.92. What was the probability of a machine being broken down?

U3 – Probability
Probability
No Calculator Allowed

1. Level 6

A dice is thrown and a coin is flipped, fill in the sample space diagram to find all possible outcomes. Then answer the questions that follow:

	1	2	3	4	5	6
H		H, 2				
T				T, 4		

Find the probability of getting:

a) a head

b) a four

c) an even number

d) a two or a four

e) a head and a 5?

2. Level 6

A bag contains counters that are red, black, or green.

$\frac{1}{3}$ of the counters are red

$\frac{1}{6}$ of the counters are black

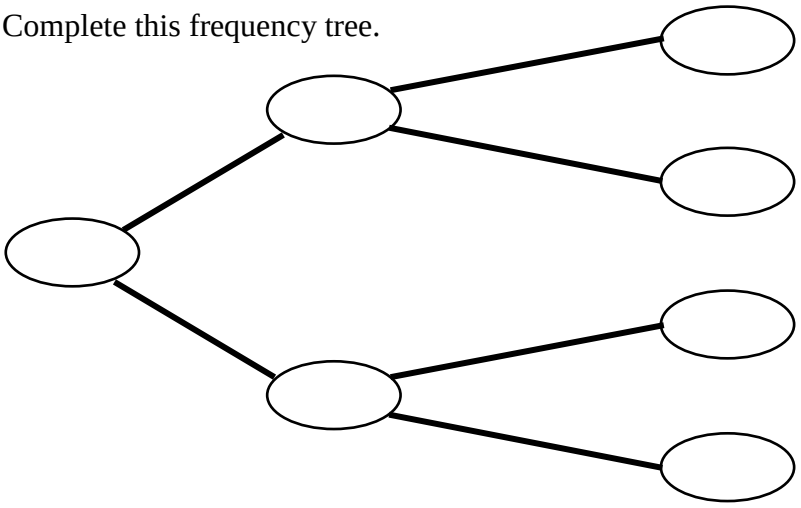
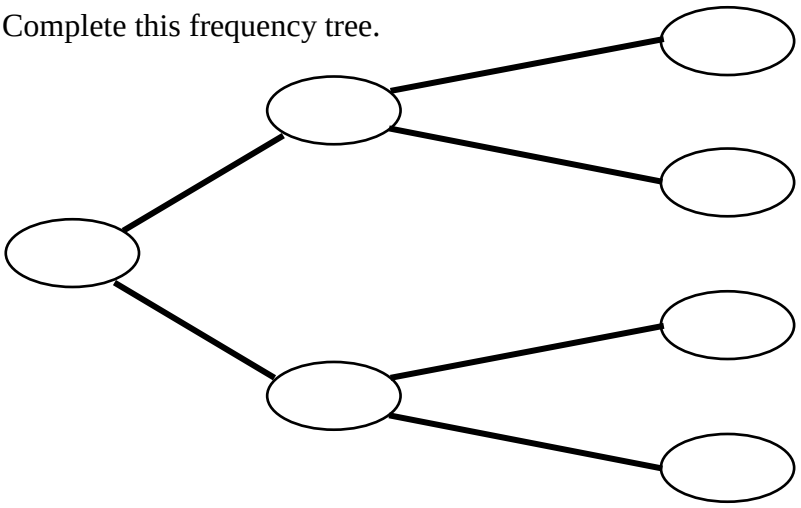
There are 15 green counters in the bag.
How many black counters are in the bag?

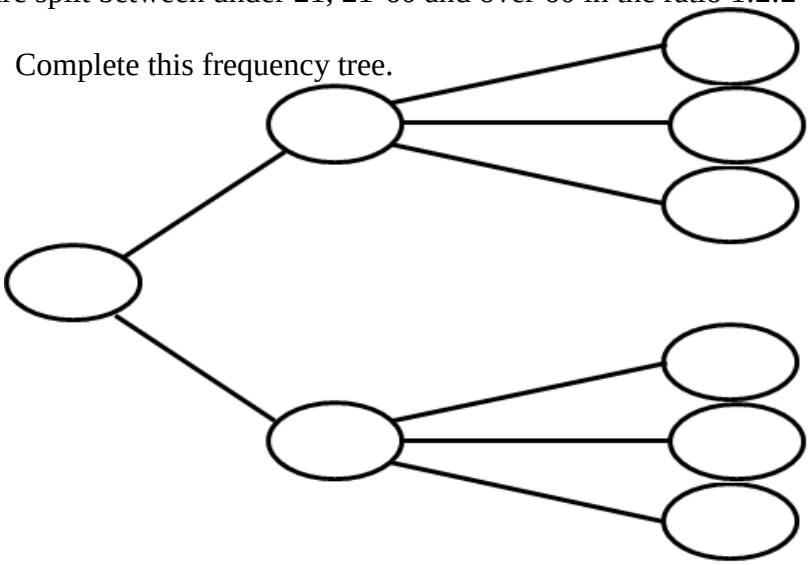
3. Level 6

I have three fair dice, each numbered 1 to 6
I am going to throw all three dice.

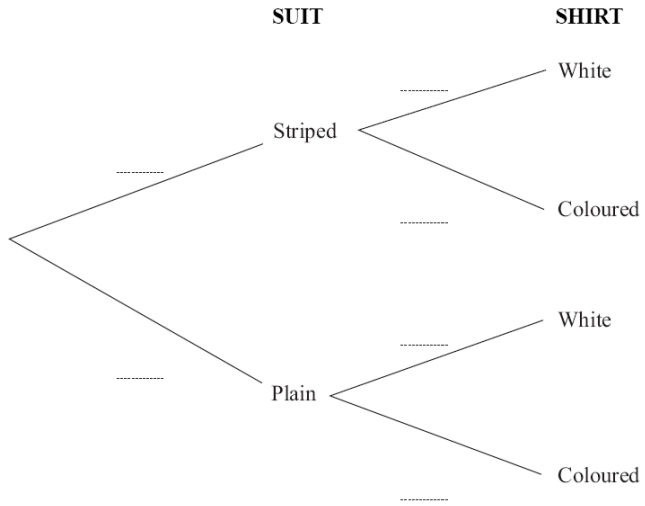
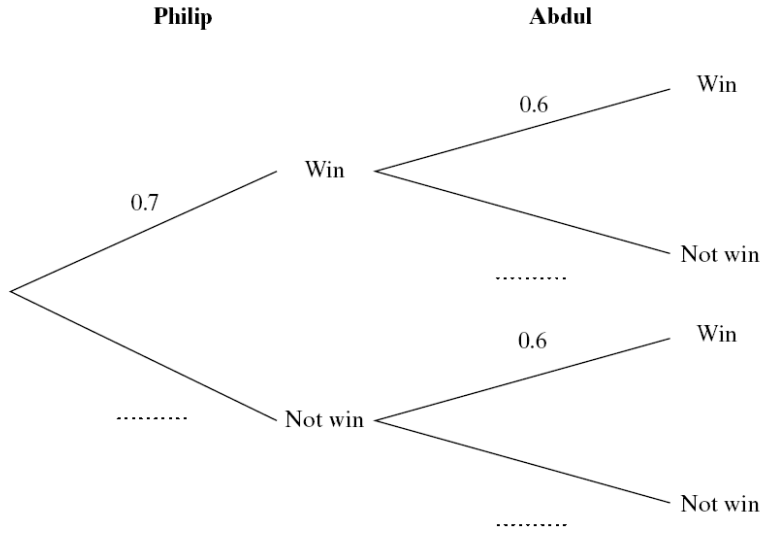
What is the probability that all three dice will show a six?
The same number?

U3 – Probability
Frequency Trees
No Calculator Allowed

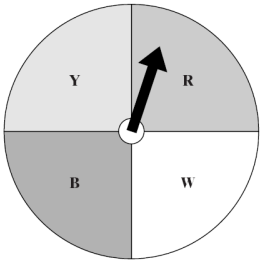
There are 120 staff working in a school. They drink coffee OR tea, and only take milk OR sugar (not both). 72 of the staff drink coffee. Of the coffee drinkers, 45 take milk and the rest sugar. The others drink tea, 12 take milk the rest sugar. a) Complete this frequency tree.  b) Use your frequency tree to work out the probability of a member of staff chosen at random drinking coffee with sugar.	Level 7
There are 480 pupils in a primary school, where there are infants and juniors. There are 220 pupils in the infants. 45% of the infants are female. 55% of the juniors are male. a) Complete this frequency tree.  b) Use your frequency tree to work out the probability of a pupil chosen at random being male.	Level 7

There are 188 members of a tennis club. 108 of the members are male. The males are split between under 21, 21-60 and over 60 in the ratio 3:4:2 The females are split between under 21, 21-60 and over 60 in the ratio 1:2:2 a) Complete this frequency tree.  b) Use your frequency tree to work out the probability a randomly chosen member being over 60 years old.	Level 7
132 people took a driving test. 80 people predicted they would pass. 64 people didn't pass. Of these 64 people, 3 times as many people predicted they would pass as predicated fail. Draw a frequency free in the space below:	Level 7

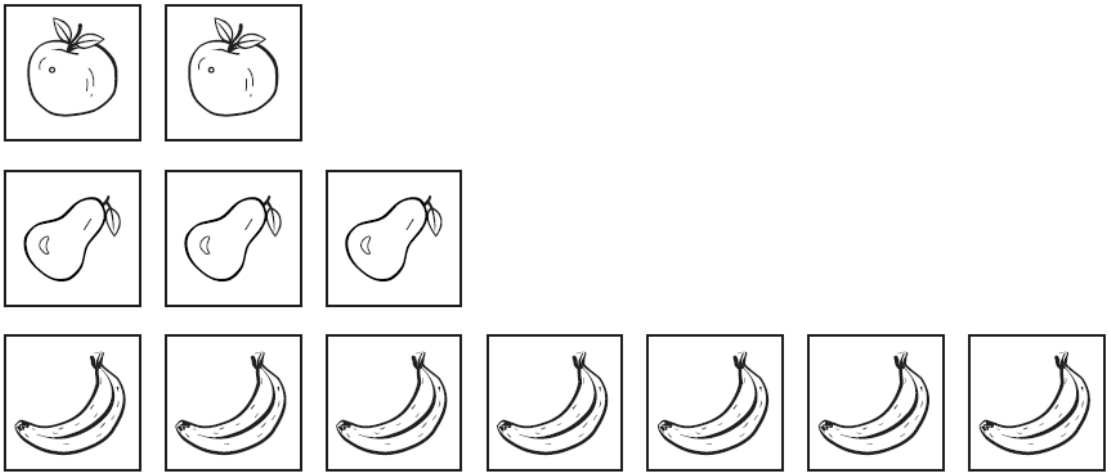
U3 – Probability
Tree Diagrams
No Calculator Allowed

1. Greg has four suits, one is striped and the other three are plain. He also has ten shirts, four are white and the other six are coloured. Greg chooses a suit at random and then chooses a shirt at random. (a) Fill in the probabilities on the branches of the tree diagram.  (b) Calculate the probability that Greg chooses a plain suit and a coloured shirt.	Level 7-8
2. Philip and Abdul run in different races. The probability that Philip wins his race is 0.7 The probability that Abdul wins his race is 0.6 (a) Fill in the missing probabilities on the tree diagram.  (b) Calculate the probability that only one of the boys wins his race.	Level 7-8

U2 – Probability
Tree Diagrams
No Calculator Allowed

1. A fair spinner has six sections of equal size. One section is blue, two sections are green and three sections are red. The spinner is spun twice. (a) Calculate the probability that it lands on the same colour both times. (b) When the spinner lands on a blue section 7 points are scored. When the spinner lands on a green section 5 points are scored. When the spinner lands on a red section 3 points are scored. Calculate the probability of scoring exactly ten points in two spins.	Level 8
2. A fair spinner has four equal sections. The sections are coloured red (R), white (W), blue (B) and yellow (Y).  The arrow on the spinner is spun three times. Calculate the probability that the arrow lands on the same colour at least twice.	Level 8
3. A dice is rolled 3 times in a row. What is the probability of getting a) A six on the third roll only b) A six exactly once c) Two sixes d) at least two sixes?	Level 8

U2 – Probability
Non Replacement
No Calculator Allowed

1. A bag contains 4 red, 3 yellow and 2 purple discs. A disc is taken, at random, from the bag and is **not** replaced. A second disc is then taken, at random, from the bag. Calculate the probability that the two discs taken from the bag are (a) both red, (b) different colours.	Level 8
2. Ingrid has 12 picture cards. There are 2 apples, 3 pears and 7 bananas.  Ingrid chooses 2 cards at random. Calculate the probability that both cards are the same. You **must** show your working.	Level 8

U2 – Probability
Probability
No Calculator Allowed

1. Sally has a bag of 9 sweets. In the bag there are: 3 orange flavouured sweets 4 strawberry flavoured sweets And 2 lemon flavoured sweets. Sally takes at random 2 of the sweets and eats them. Work out the probability that the two sweets Sally eats are not the same flavour	Level 8
2. A computer is used to generate three digit random numbers from 000 to 999. E.g 006, 000, 977, 125, … Given that a generated number is a multiple of three, find the probability that it is also a multiple of 4	Level 8
3. There are ten socks in a drawer. 7 are brown 3 are grey Fred takes two socks at random, at the same time from the drawer Work out the probability that he gets two socks of the same colour	Level 8
4. Some students decide to organise a day out. They can only go on a Saturday or a Sunday. $\frac{7}{12}$ of students choose a theme park. The rest choose a water park. $\frac{5}{7}$ of those choosing the theme park prefer Saturday. $\frac{8}{15}$ of those choosing the water park prefer Sunday. (a) One person is chosen at random. Calculate the probability that this person prefers Saturday. (b) Of the students, 88 prefer Saturday. How many students are there altogether?	Level 8