GCSE 7+ Session 8
Independent Practice
Probability

KING'S MATHS SCHOOL

***Revise, refresh, recall** the core knowledge and skills:*

1 In a sixth form, $\frac{3}{4}$ of the students study Maths and $\frac{2}{3}$ of the students study Physics. $\frac{1}{6}$ of the students study neither Physics nor Maths.

a) Represent this information using a two-way table.

b) What fraction of the students study both Physics and Mathematics?

b) What is the probability that a randomly chosen Physics student studies Maths?

2 Past experience tells me that

- I have soup for lunch with probability $\frac{2}{7}$
- I have both soup and salad for lunch with probability $\frac{1}{4}$
- I have salad for lunch with probability $\frac{3}{4}$

a) Represent this information using a two-way table.

b) What is the probability that I have neither soup nor salad?

c) I will definitely have salad for lunch tomorrow. What is the probability that I will have it with soup?

3 In a box of grapes there are 7 green grapes and 3 purple grapes. I take out a grape, eat it, then choose and eat another grape. Which is more likely: that I eat two grapes that are the same colour or two grapes that are different colours?

4 In a hurry, I take three pens at random from a box containing 3 red pens and 5 blue pens. What is the probability that at least one of the three pens is red?

***Practice makes permanent:** these questions will help you embed and make secure your factual knowledge, procedural fluency and conceptual understanding:*

5 I am going to take a test. I think that the probability I will pass the test the first time is 0.4. If I fail the test, I will revise for a week then take a re-test. I think that the probability I will pass the re-test is 0.8. Work out the probability that I pass the test.

6 When Mr Greedy chooses his lunch, he picks either 'meat' or 'fish' or 'veggie' for his main course. The probability that he picks 'meat' is $\frac{1}{4}$ and the probability that he picks 'fish' is $\frac{5}{12}$. When he picks 'meat', the probability that he also has chips is $\frac{2}{3}$; when he picks 'fish', the probability that he also has chips is $\frac{2}{5}$.

Overall, the probability that he has chips is $\frac{5}{12}$.

a) What is the probability that when Mr Greedy picks 'veggie' he also has chips?

b) Mr Greedy is very much enjoying his plate of chips. What is the probability that he is eating them with a 'veggie' main course?

7 Every day, I walk past a lovely bakery near my local station.

- On Tuesdays, I buy a doughnut with probability $\frac{7}{15}$.
- If I buy a doughnut on Monday, I then buy one on Tuesday with probability $\frac{1}{6}$.
- If I do not buy a doughnut on Monday then I buy one on Tuesday with probability $\frac{2}{3}$.

a) What is the probability that I buy a doughnut on Mondays?

b) It is Tuesday and I am very much enjoying my newly-bought doughnut. What is the probability that I also bought a doughnut yesterday?

Productive struggle: *these harder questions require deeper thinking.*

8 When a call is made to a coastguard station, the probability that a lifeboat will be required is $\frac{1}{2}$ and the probability that a helicopter will be required is $\frac{3}{5}$. The probability that both a lifeboat and a helicopter will be required is $\frac{1}{5}$.

a) Represent this with a tree diagram, starting with "lifeboat required" and "lifeboat not required".

b) Also represent this with a tree diagram, starting with "helicopter required" and "helicopter not required".

c) Use each representation to work out P(neither a lifeboat nor a helicopter is required). Check you get the same answer each time!

9 When the AA is called to a breakdown, there is a probability of $\frac{3}{5}$ that the car has run out of petrol. There is a probability of $\frac{5}{8}$ that the engine has failed.

What are the maximum and minimum possible values of the probability that the engine has failed and the car has run out of petrol?

10 Agree or challenge: "Robert is in my Y9 class. Half the students in my Y9 class have brown hair. So the probability that Robert has brown hair is 0.5."