Level 4: Probability

1) Learn to find the probability of an event occurring, for example: -

In a car park there are ten black cars, eight silver cars, four red cars and two blue cars. What is the probability that the next car to leave is red?

Total number of cars = 10 + 8 + 4 + 2 = 24

$$P(red)^* = \frac{Number\ of\ red\ cars}{Total\ number\ of\ cars} = \frac{4}{24} = \frac{1}{6}$$

In maths we often express probabilities as fractions – remember to simplify!

*P(red) is shorthand for "Probability of a red car leaving next"

2) Learn to compare probabilities, for example: -

Two brothers have a very poor record for getting to school on time.

- In eleven days Jack has been late 4 times.

- In seven days Joe has been late 3 times

Who is more likely to be late?

When comparing probabilities, we can either convert them to a decimal if a calculator is available or, without a calculator, we may need to convert them to fractions with a common denominator.

With a calculator: -

P(Jack late) = $\frac{4}{11}$ = 0.36363636……

P(Joe late) = $\frac{3}{7}$ = 0.428571……..

Joe is more likely to be late because 0.4285… is greater than 0.3636…

Without a calculator: -

$$P(\text{Jack late}) = \frac{4}{11} = \frac{28}{77}$$

$$P(\text{Joe late}) = \frac{3}{7} = \frac{33}{77}$$

Joe is more likely to be late because $\frac{33}{77}$ is greater than $\frac{28}{77}$.

Percentages can also be used to express probabilities, although fractions and decimals are more commonly used in school maths.

3) Use probabilities to make predictions, for example: -

The probability of a bus being late is $\frac{3}{10}$. How many times would you expect the bus to be late in the next 20 days?

$$\frac{3}{10} \text{ of } 20 = 6 \text{ times}$$

Note this is a prediction based on past performance, the bus is not guaranteed to be late 6 times in the next 20 days.

4) Solve problems such as: -

Schools are asked to send teams to a maths competition in Edinburgh.

- Smalltown High School has 322 pupils, and it sends a team of five pupils.
- Grandville Academy has 748 pupils, and it sends two teams of five pupils.
- City High School has 956 pupils and it sends three teams of five pupils.

In which school is there a higher probability of getting picked to go to the competition in Edinburgh?

**REMEMBER TO SHOW ALL YOUR WORKING
AND EXPLAIN YOUR ANSWER FULLY!**