

**Age 14+ Level ★★★****Worksheet 2****1. Two Girls**

There are 10 girls in a mixed class.

If two pupils from the class are selected at random, then the probability that both are girls is 0.15.

How many boys are in the class?

2. Phone Call

A new taxi firm needs a memorable phone number.

They want a number which has a maximum of two different digits.

Their phone number must start with the digit 3 and be six digits long.

How many such numbers are possible?

3. Dropouts

A language school reports that:

- 75% of students starting a French course have never been to France
- Of the students who have never been to France, 60% graduate.
- Of the students who have visited France before, 70% graduate.

What percentage of the students who graduate had never been to France?

4. Winning Marble

A prisoner is given a chance to win her freedom.

She is given two boxes and some marbles.

She must put the marbles into the boxes.

Afterwards, she will be blindfolded, and will choose a box and select a marble. If she draws a white marble, she will go free; otherwise, she will remain in prison.

The prisoner has 10 white marbles and 10 black marbles. She can put as many of the marbles of each colour as she likes into each box. She must use up all the marbles.

How can she maximise the probability that she will go free?

In that case, what is the probability that she will go free?

These problems are adapted from UKMT (ukmt.org.uk) and WMC (competition.ac) problems.