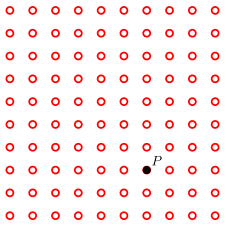
Problem of the Week
Problem C and Solution
Dot to Dot



Problem

A 10 by 10 grid is created using 100 small circles, as shown. The circle labelled P has been coloured in on the grid. One of the other 99 circles on the grid is randomly chosen to be labelled Q and coloured in as well. What is the probability the line segment connecting P and Q is vertical or horizontal?

Solution

Line segment PQ is vertical if Q is chosen from the circles in the column in which P lies. In this column there are 9 circles other than P which could be chosen to be Q so that PQ is vertical.

Line segment PQ is horizontal if Q is chosen from the circles in the row in which P lies. In this row there are 9 circles other than P which could be chosen to be Q so that PQ is horizontal. Each of these 9 circles is different from the 9 circles in the column containing P. Thus, there are $9 + 9 = 18$ circles which may be chosen for Q so that PQ is vertical or horizontal.

Since there are a total of 99 circles to choose Q from, the probability that Q is chosen so that PQ is vertical or horizontal is $\frac{18}{99}$ or $\frac{2}{11}$.