



Problem of the Week

Problem C and Solution

Diamond in the Rough

Problem

Using 144 diamonds, the 12 by 12 grid of diamonds below is created. One of the diamonds is coloured and labelled X .



One of the other 143 diamonds in the grid is randomly chosen and is coloured in and labelled Y . What is the probability the line segment connecting X and Y is vertical or horizontal?

Solution

Line segment XY is vertical if Y is chosen from the diamonds in the column in which X lies. In this column there are 11 diamonds other than X which could be chosen to be Y so that XY is vertical.

Line segment XY is horizontal if Y is chosen from the diamonds in the row in which X lies. In this row there are 11 diamonds other than X which could be chosen to be Y so that XY is horizontal. Each of these 11 diamonds is different from the 11 diamonds in the column containing X . Thus, there are $11 + 11 = 22$ diamonds which may be chosen for Y so that XY is vertical or horizontal.

Since there are a total of 143 diamonds to choose Y from, the probability that Y is chosen so that XY is vertical or horizontal is $\frac{22}{143}$ or $\frac{2}{13}$.