

Surname: Ong Name: Ci Hui Minh Ngoc

Grade: Primary 3 School: Kong Hwa School (Singapore)

Square Corners

I used the interaction on the website to investigate and observe the 4by4 grid. I observed the followings:

- (1) Maximum 10 counters can be chosen without forming any square, if I chose counters along one edge first.
- (2) Maximum only 9 counters can be chosen without forming any square, if I chose every counter along one of the diagonals of the square (Line of symmetry) first.
I wonder whether this situation will repeat in other square grids, 2by2, 3by3, 5by5, 6by6.

Investigations:

Hypotheses: I predict the situation of having more counters can be chosen without forming square if I do not choose every counter along one of the diagonals.

Methods:

- (1) Cut out square grids, 2 copies of each type 2by2, 3by3, 4by4, 5by5, 6by6.
- (2) Fold each square paper along as shown, similar to doing origami in order to help in identify square during counter selection to avoid those counters can form square.
- (3) One grid paper of each type begins with selection of all counters along one of the diagonals. Then select counters on one side of the diagonal which will not form square. Progress to selection of counters on other side of the diagonal
- (4) Another grid paper of each type begins with selection of all counters along the one of the edges. Progress to selection of counter over the paper.
- (5) Use colour pens to mark the selected counters. Count the number of counters selected. Write these on the square paper and paste them as shown.

Results

Number of Counters selected and not forming any square (not part of the corner of a square)					
Grids	2by2	3by3	4by4	5by5	6by6
(1) Choose every counter on 1 diagonal	3	6	9	14	18
(2) Choose counters on one of the edges	3	6	10	15	20

Conclusions:

For each column, results of 2nd row always equal or greater than results on 1st row. That means not to choose every counter on diagonal, will always have number of equal or more counters not forming square.

Why:

It may be related to line of symmetry.

Suggestions:

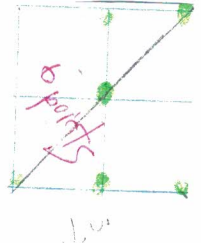
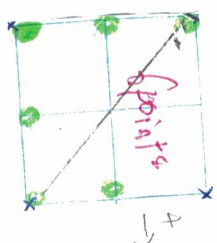
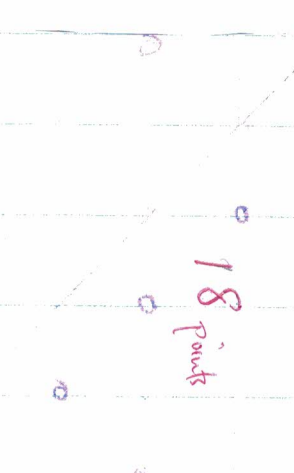
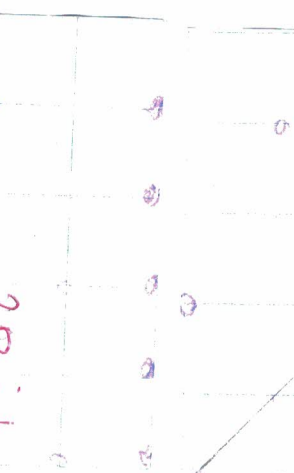
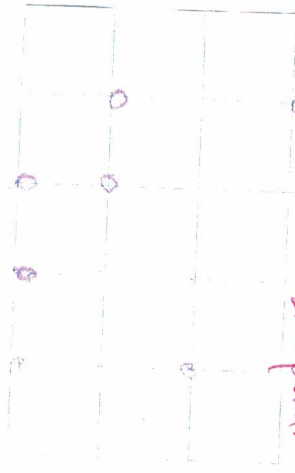
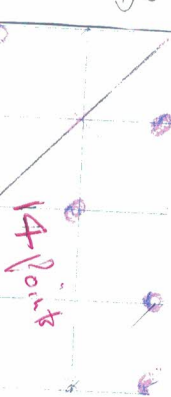
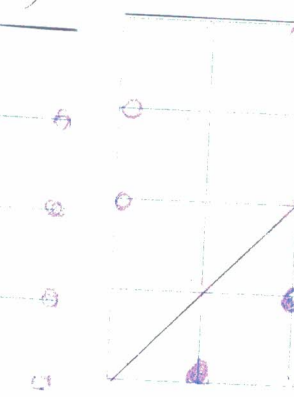
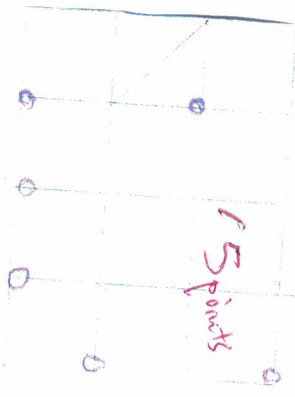
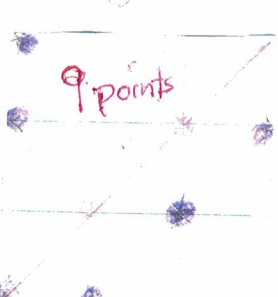
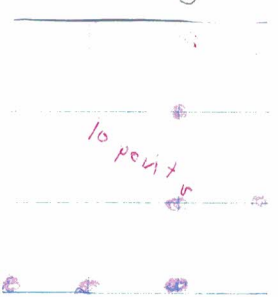
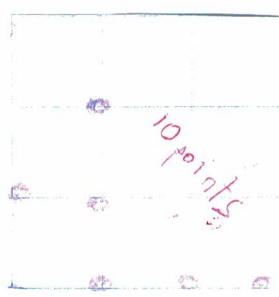
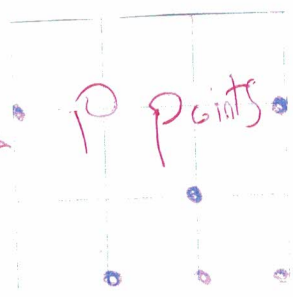
Rich please allow user to have option to change the number of grids, so user can try to investigate by changing the grid number online.

Additional page:

Cutting of grid squares with counters chosen.

A handwritten signature in blue ink, appearing to read 'yes' followed by a flourish.

based on
interaction
on NR197



2x2 (4)

3x3 (1)

Additional Page

Eng. C. Hari Prasad Rao

Handwritten signature