Catelynn Anderson
Math 3 P.4
Pow 5

POW 5 write up

Problem Statement:

For this POW, we are to find out different ways that a sprinkler can be placed so that a certain number of flowers are equally watered. We have to find different situations and placements for both flowers and the sprinkler, and prove that the flowers are all equidistant from the sprinkler. We also have to show this scenario for different quantities of flowers. 3 flowers, 4 flowers, 5 and so on.

Visual representation:
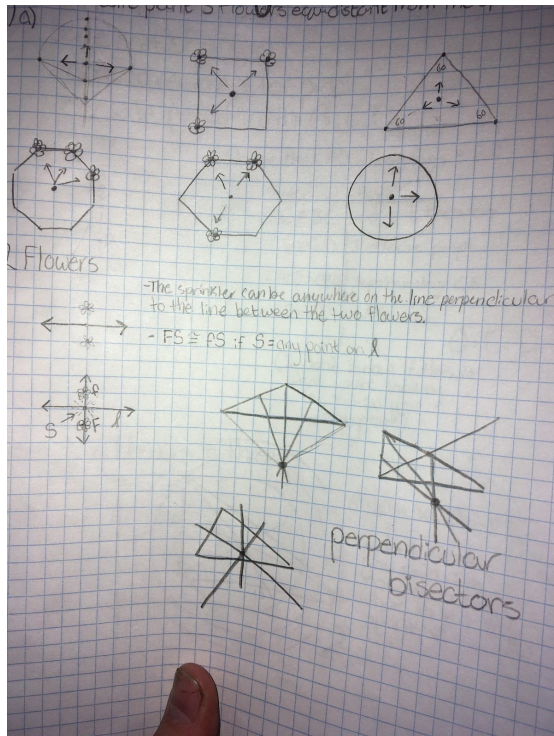
Process:

 I started off thinking very inside the box. I thought it was all so easy and that you could only have equidistant/equally watered flowers if they were on the perimeter or on the vertices of certain symmetrical shapes. (As you can see at the top of the page, I proved that the flowers would be equidistant from the sprinkler using shapes and only finding places for the sprinkler on the inside.) Then I overheard Hannah talking about bisectors, which reminded me of last semester when we had to draw bisectors from the vertex of triangles through the side opposite of that vertex, and I thought that could be a way to solve this problem. But after measuring the distance from my estimated sprinkler point, I realized that wasn't the answer (which is shown near the bottom of the page). I then decided to actually converse with my peers and Hannah which is when I began to see how perpendicular bisectors factor in to this problem. If you have three flowers, which when connected for a triangle, and you put perpendicular bisectors through each side of the triangle, you will see that they all intersect at one point. This point marks where the sprinkler must be to be equidistant from all three flowers. (Which you can see at the very bottom of the page).

Solution: I came to the conclusion that for two flowers, the sprinkler can be placed anywhere on a line perpendicular to the line made between the two flowers. For three flowers, you must draw lines between the flowers, creating a triangle. Then, draw perpendicular bisectors through that midpoints of each side to the triangle. Where all of the segments intersect is the point at which the sprinkler would be equidistant from all three points, therefore equally

watering all flowers. For larger quantities of flowers, the flowers must be placed on the perimeter of a circle, with the middle of the circle being the sprinkler.

Evaluation: At first, I didn't take this problem seriously. I thought that it was so simple, and that everyone should be able to see that to make the sprinkler equidistant from the flowers, the flowers must be placed the same distance away from the sprinkler. As simple as that. But then I realized that we had to find out where to put the sprinkler without a symmetrical placement of flowers. I had to figure out where the point was in problems involving three vertices creating isosceles triangles, and even more complicated, scalene. I thought, at first, that it was impossible to find the exact point to put a sprinkler to make it equidistant from all three points, especially if they were vertices of a scalene triangle. But I was proven wrong and gained a new perspective from my classmate about the perpendicular bisectors, which made me realize that this was a more complicated problem than I thought. This POW was fun and interesting for me.

Self-assessment: I feel that I deserve an A. I persevered through different problems and found my answer through a lot of trial, error, and confusion. It was a good learning experience. (It helped when Hannah encouraged us to brainstorm without giving the answer away, always nudging us to take our ideas further without giving actual answers).