Alessandro Bogoni

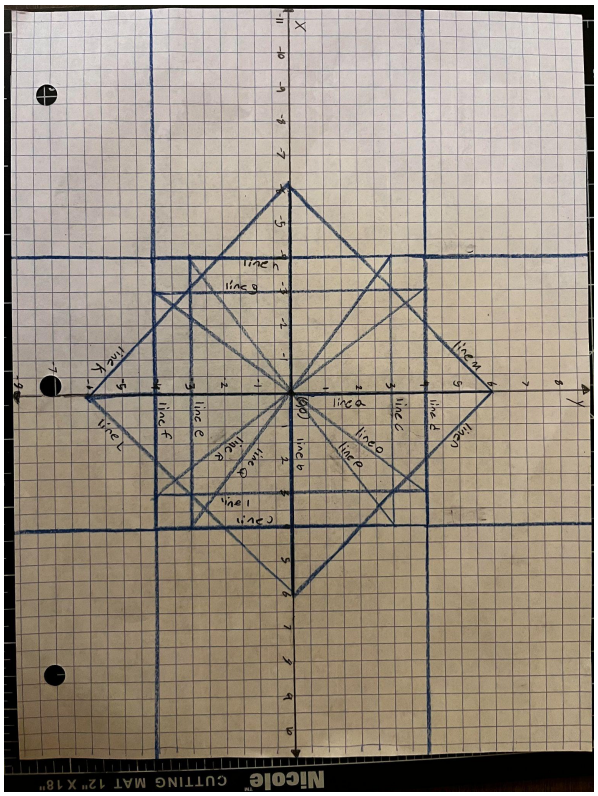
Teacher's Name: Ms. Gasser

Algebra 1, C Band

Algebra 1, Quarter 2 Benchmark: Make Your Own Design!

Introduction:

In this benchmark project, I had to make a design on paper and transfer it to lined paper. After that, I had to explain the different types of lines and equations and then show how I found each line. After all of that, I input it into desmos an online graphing system. I chose this shape or design I made because I like how the lines meet to make a symmetrical shape.



1. **Slope-intercept form**

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For this example, we will use line P. Find the y-intercept this is where the line crosses the y-axis = b of the equation y = MX + b. Plot the y-intercept. The point will be (0, b) on our paper we can see line P goes through the y-intercept at point (0,0) or the origin. Find the slope=m of the equation y = MX + b to do this we look at rise over run. Make a single step from one point to another point on our graph I will use (0,0) to (1.5, 2) using the rise 1.5 the amount on the y we go up, and run the amount we go horizontal on the x from the slope. (Make sure you go up to the right if positive and down to the right if negative.) Connect those two points with your line to get (y=1.5/2x) remember our b is 0 so we don't even have to write it.

2. **Point-slope form**

   To graph point-slope form (y – y1 = m(x – x1)), first plot the point (x1,y1). Then, use the slope (m) to find a second point on the line. Finally, draw a straight line through the two points. Then, use the slope to find a third point. We will use line O. Starting at the origin the slope of line O is (2/1.5), so move up 2 and right 1.5. The new point is (2, 1.5). Plot this point. Finally, draw a line through these two points.

   Ex. Graph y – 7 = -2/1.5(x – 1.5)+2

3. **Horizontal lines**

   Horizontal lines have a slope of zero. This means no rise value. To graph, a horizontal line in the coordinate system, use the equation y = k, where *k* gives the point on the y. *y*-axis that the line will intersect.to show this we will use line F where y = -4 because there are no increasing or decreasing values this stays the same.

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4. **Vertical lines**

   Vertical lines go up and down and have a slope that is undefined this means no y-axis. Graphs of horizontal lines are parallel to the x-axis. Graphs of vertical lines are parallel to the y-axis. Let's use the equation x = k, where *k* gives the point on the x. *x*-axis that the line will intersect.to show this we will use line g where x = -3 because there are no increasing or decreasing values this stays the same.

5. **Parallel lines**

   Parallel lines are straight lines that never meet each other no matter how long we extend them. Line e is parallel to line f, and line h is parallel to line g.

6. **Perpendicular lines**

   Perpendicular lines are lines that intersect at a right (90 degrees) angle. They have opposite reciprocals this means their slope is completely opposite to one another but the y-int doesn't matter because they will intercept always. An example of these lines r and p.there equations are y=-2/1.5x and for p since they are opposite are just flipped being. y=1.5/2x. There is no b because these lines pass through the origin.

Now I am going to implement these types of equations into graphing.

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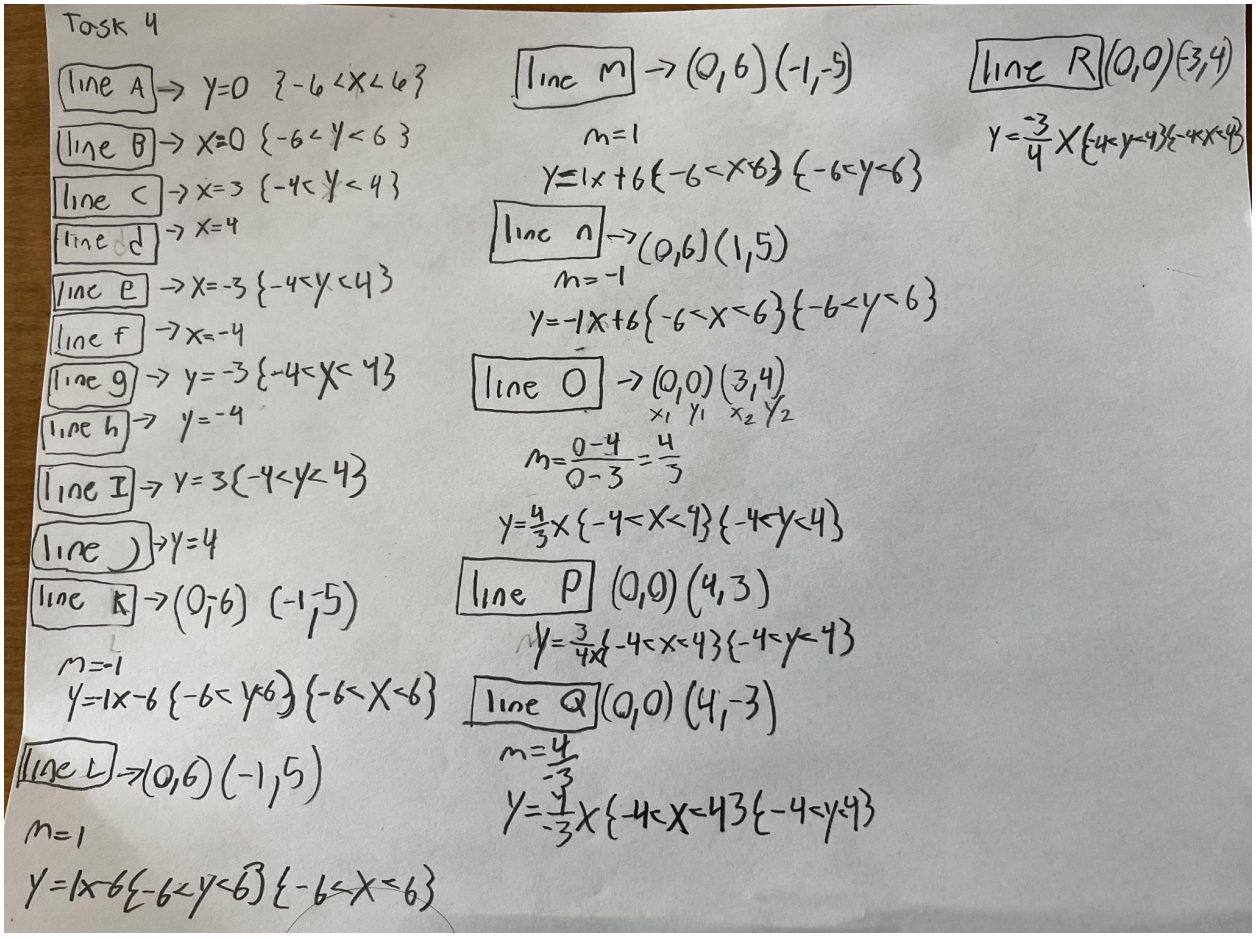

To look at these in a more clean and simplistic form I have inserted these equations into desmos.

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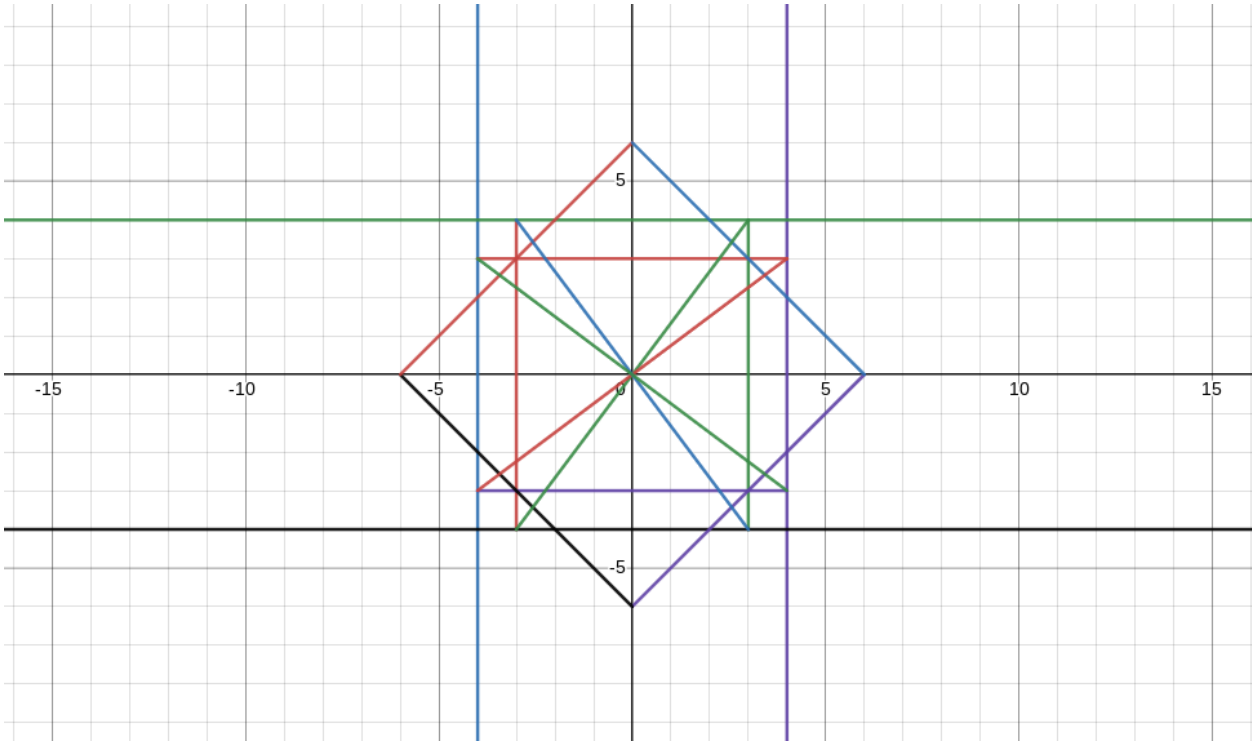

Reflection

I feel like during this project I managed my time really well asking questions constantly so I never got stuck. I learn how to talk about my mathematical thinking from the last 2 benchmarks which is a very useful skill for teaching myself. In this project, I learned how to graph lines with starting and ending points. Overall, I really did enjoy this benchmark because I've never done anything like this before.

This is my artistic version.

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