Homework 1 – Circles

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CodeSkulptor Link: https://py3.codeskulptor.org/#user309_7mUU8n6DPE_2.py

1. **Question 4.F.i:** How will the midpoint, slope, and perp functions help to find the center and/or radius of the circle?

As stated in the solution strategy in Canvas, to get the center of the circle, we need to get a line connecting two points and find its perpendicular line. Once that is done for two pairs of points, where the perpendicular lines intersect is the center of the circle. How these helper functions will play a role in that is as follows. The slope function will get us the slope of the line between two points selected. Then, we can easily find the perpendicular slope with perp(). We now have the slope and need a full line; to do this, we will need one point for the perp slope. Using midpoint for the same two points, we can get the full line perpendicular at the midpoint. Doing this for two different pair of points allows us to find the center of circle. This is vital information we will use for the following two helper functions.

2. **Question 4.F.ii:** How will the intersect function help to find the center and/or radius of the circle?

After finding the perpendicular lines for two different pair of points, all we need to do to find the center of the circle is find their intersecting point. This can easily be done with the

intersect() function. By passing the perp slope and its corresponding x and y midpoints for two pairs of points, the function will return the center.

3. **Question 4.F.iii:** How will the distance function help to find the center and/or radius of the circle?

   Now that the center has been found, the radius of the circle can be found by finding the distance between the center and any of the three points passed to make_circle() using distance().

4. **Describe an algebraic method for finding the center of the circle.**

Another way to find the center of the circle is using the equation of a circle:

$(x-h)^2+(y-k)^2=r^2$.

By substituting each one of the three points to the equation, we can use a system of equations to solve for *k* and *h* by eliminating r^2. On paper, it can be a lengthy process, but can easily be simplified using python.

5. Reflection

Two important concepts/skills reinforced in this assignment are Python fundamentals and linear equations. This assignment utilized introductory python fundamentals that allowed me to understand how to name my variables properly and organize my code. We did this by working with basic geometry and linear equations to find a circle. Although both are basic concepts, this is the first assignment, and it helped me become comfortable with Python as we started this course.

The skills mentioned above allowed me to understand where I stand as a python programmer and allowed me to assess my success in this course. Now that I have refreshed some fundamentals, I believe I will be successful in this course.

I believe I did well on this assignment in being efficient in my code and used less lines than average. Since the math and the outline was provided, I was mostly using this assignment to understand python syntax. If I had to do this assignment over, I would learn the variable naming convention before finishing the assignment, because I had to go back and change the name of several variables to get full points.

Yes, I am comfortable enough with the concepts in this course. I have been exposed to Python in the past, and now that I went through the assignment, I would be comfortable enough to teach a peer.