

# A Guide to Written Math Solutions

## Math 110 Section 002

Matt Coles

September 14, 2013

When writing your solutions, please pay attention to the following points:

- Use full and complete English sentences.
- Each page should contain a single column and the solution should read from top to bottom in a coherent manner.
- If you type your solution, feel free to leave space for equations and figures that you draw in by hand.
- If you write by hand, I suggest you start with a rough draft, and only after understanding the entire argument, writing a good draft.
- When using theorems, properties and rules discussed in class you must state the name of the theorem/property/rule you are using. Ex: “An application of the Pythagorean Theorem yields . . .”, “The above was obtained using the distance formula . . .”
- Define all of the variables you use. In other words, do not use any letters or symbols without first defining what they represent.
- The expectation is that another student in the class who is several weeks behind in the course should be able to read, understand and learn from your solution.

The following example problem is #23 in Section 0.2 of the text. The statement was also proved in class.

**Problem:** Show that the equation of the circle with centre  $(x_0, y_0)$  and radius  $r$  is,

$$(x - x_0)^2 + (y - y_0)^2 = r^2. \tag{1}$$

**Solution:** Take a circle with centre  $(x_0, y_0)$  and radius  $r$ . Consider an arbitrary point on the circle and call it  $(x, y)$ . We seek a relationship between  $x$  and  $y$ . Each point on the circle will be distance

$r$  from the centre. As discussed in class, the distance,  $d$ , between any two points,  $(x_1, y_1)$  and  $(x_2, y_2)$ , satisfies the following distance formula,

$$d^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2. \quad (2)$$

So, if the distance between our point on the circle,  $(x, y)$  and the centre,  $(x_0, y_0)$  is to be  $r$  then the following equation must hold,

$$r^2 = (x - x_0)^2 + (y - y_0)^2. \quad (3)$$

Behold, this relationship between  $x$  and  $y$  is exactly the required formula and so we are done.