	Score (5 pt. scale)	Comments
Mathematical Correctness/Completeness	4	
Depth of Understanding	3	
Justification and Explanation	2	$\frac{16}{25}$
Coherence and Clarity	3	
Neatness, Organization, Grammar, Spelling, and Effort	4	

Key to Marks on Papers: + Practically perfect in every way; √ Good; with minor problems; − Substantial problems; × Serious problems

MA0110 - Mathematical Explorations – Spring 2014
Notebook Quiz: Chapter 2 – The Golden Ratio

Instructions: Each of the following refers to an investigation from our text <u>Discovering the Art of Mathematics – Number Theory</u>. You are to provide complete, coherent, justified, neat, and mathematically correct solutions to each of these problems. You can only refer to your notebook during this quiz. You are not allowed to use your text, any notes that are not part of your spiral notebook, nor receive any help from other group members.

Number 16: When you continue the fraction, you get

(red note: Explain this step!)

$$\cfrac{1}{1 + 1 + \cfrac{1}{1+\cfrac{1}{1+\frac{1}{1+\frac{1}{1}}}}} = 1 + 1 + \frac{8}{5} = \frac{13}{8}$$

The numbers in the continued fractions are the Fibonacci numbers.

Number 22: The formula for the continued fractions would be $x = (1 + \frac{1}{x})$. To get this we used x as what we were trying to figure out and also to represent the smaller fractions that continue in the denominator after "1 + ...".

Number 24: $x^2 = x + 1$ $\boxed{x^2 - x - 1 = 0}$ The solution to the value of x exactly is $\frac{1+\sqrt{5}}{2}$ and this is similar to previous problems 6 and 12. The solution to the problem approaches the Golden Ratio but it will never equal it exactly. It is always just over and just under 1.618.

(red note: It's the same, right?)

Number 28: $(1/\sqrt{5})((1+\sqrt{5})/2)^{\wedge}A1$

formula to enter in excel sheet

And what happens?

Number 33: The rectangle DEHG is a Golden Rectangle. The length of the longer side is 0.618. The length of the shorter side is 0.382. In order for a rectangle to be a Golden Rectangle the ratio of the longer side to the shorter side must be the Golden Ratio. In this case, 0.618 : 0.382 equals 1.618. *which?*

Number 36: Yes. This pattern is aesthetically pleasing because the arc is always occurring in the same way to form the spirals like what is seen in the shells.

Number 46: The areas of shape A's rectangle and square and shape B's rectangle and square are not compatible. Shape A's rectangle has an area of 168 and the square is 169. Shape B's rectangle has an area of 65 and the square is 64. They are close but they are not the same number. +

Number 51: Yes, shape C's rectangle and square areas are compatible. Each has an area of $2+3\emptyset$. In shapes A and B, there was a gap at the diagonal which caused the areas not to be compatible. For shape C, $\emptyset$ takes out the gap of the diagonal so the areas are compatible.

Say how you got these!!