Name:

| | Score (5 pt. scale) | Comments |
|---|---|---|
| Mathematical Correctness/Completeness | 3 | |
| Depth of Understanding | 3 | |
| Justification and Explanation | 0 | 16/25 |
| Coherence and Clarity | 5 | |
| Neatness, Organization, Grammar, Spelling, and Effort | 5 | |

**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 Discovering the Art of Mathematics – Number Theory. 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: If you were to continue the pattern that would come next in the pattern following investigations 13-15, the continued fraction for this problem would be $\frac{13}{8}$. I got this problem because I added the number 1 to the fraction $\frac{1}{\frac{8}{5}}$. After solving this, my solution was $\frac{13}{8}$. ✓ Show it!!

Number 22: when denoting the unknown continued fraction by using only the number 1 and the variable x as an algebraic expression ~~containing~~ containing only standard fractions, the solution (equation) I came up with was $\boxed{x = 1 + \frac{1}{x}}$. Why? In this equation, x = everything we have already solved in previous problems. ✓

$x = 1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \dots}}}}$

Not written correctly!

Number 24: when using my answers in investigation 23 and earlier problems to determine the value of x exactly, my solution is x = 1.618 because I got ~~this by~~ doing out $x^2 = x+1$ which then turns out to $x^2 = 1.618 + 1 \rightarrow x^2 = 2.618$. You then take the square root of this to get x = 1.618. This answer does agree with my answer in investigation 21 because our previous answers have turned out to be 1.618. ✓

Use #6!

Why?!?

Number 28: After figuring out the solutions in #27 when plugging in the given numbers (1, 2, 3, 4 ... 8) for n in the $b_n = \frac{1}{\sqrt{5}}\left(\frac{1+\sqrt{5}}{2}\right)$ I was surprised for how close these numbers were to whole numbers.

why?

where'd you get these values?

Number 33: when using the figure 2.7 and solving to see if the smaller rectangle in this figure, which in my case is rectangle DEHG to see if it is a golden rectangle or not, I divided the length of the longer side over the shorter side. in this case, I divided .618 ÷ .382. My solution was 1.6178. My solution is the golden ratio therefore the smaller rectangle of this figure is a golden rectangle.

Draw them!!

Number 36: when I kept continuing to draw rectangles and perpendicular lines from figure 2.7, the figure was pleasing to the eye because it never gets too messy. Although the rectangles continue to get much smaller and ~~the~~ more difficult to see, you always know the pattern will keep continuing on and on no matter how small it gets.

Number 46: when comparing the solutions to problems 43 and 45, you can see they are somewhat compatible with one another. The solutions to problem 43 are 168 and 65 while the solutions to problem 45 are 169 and 64. the solutions to problem 43 are one less than the solutions in #45.
I believe you can continue this sequence if the lengths of the dimensions in both rectangles and squares are Fibonacci numbers. If you have a square though, you know the areas are going to be one less than the area of a rectangle.

How can area change?!

Number 51:
when solving for the area of shape C for #48, your solution is $\emptyset(2\emptyset+1)$ and when sowing for the area of shape C in #50 when turned into a square, your solution is $1 + 2\emptyset + \emptyset^2$. these answers are not compatible with one another. They are.