DEPARTMENT OF MATHEMATICS

MATHS 190 Lecture 3 Summary

In this lecture we illustrate two important observations:

- Certain patterns, and sequences of number reappear throughout nature. One common one is the Fibonacci sequence.
- Rabbits breeding, the numbers of spirals on pinecones and daisies, all follow the Fibonacci sequence.

Lecture 3 was based around the following question:

Question: What do rabbits, pinecones and daisies all have in common?

We started by counting spirals on pineapples and pinecones. We discovered that the number of spirals on each of these (going in opposite directions) were nearly always Fibonacci numbers. We didn't give a reason for this, because nobody knows for sure why this is.

We then showed how the number of rabbits in a population can follow a simple pattern. (The number of rabbits in one year is obtained by adding the number of rabbits in the previous two years.) This gives a sequence of numbers called the Fibonacci sequence, first discovered by the Italian mathematician, Fibonacci.

We computed the relative sizes of successive Fibonacci numbers and showed how, as the Fibonacci numbers get larger, it gets closer and closer to something called the Golden Ratio, which you'll see again later in the course.

Finally, we discussed how to write every natural number as the sum of non-consecutive Fibonacci numbers.

Before you come to the next lecture: You should spend an hour or two thinking and reading about the ideas presented in the lecture. You should also:

- Read 2.3.

Other activities you could do if you have time are:

- Find some Fibonacci numbers in nature for yourself. Bring some to the next class or tutorial if you can.
- Is the Fibonacci sequence a good model for the growth of a rabbit population? Think of some reasons for and against.