

Solutions to Quiz 1, Unit 3.2

In this quiz you will use the program I presented in the lecture to explore the behavior of the logistic equation $f(x) = rx(1 - x)$ for different values of the growth parameter r .

1. Suppose $r = 2.5$. What behavior do you observe?
 - A. The orbit approaches an attracting fixed point.
 - B. The orbit approaches an attracting cycle of period 2.
 - C. The orbit approaches an attracting cycle of period 3.
 - D. The orbit approaches an attracting cycle of period 4.
 - E. I don't observe any periodic behavior.

Solution: The answer is **A**. There is an attracting fixed point at $x = 0.6$.

2. Suppose $r = 3.838$. What behavior do you observe?
 - A. The orbit approaches an attracting fixed point.
 - B. The orbit approaches an attracting cycle of period 2.
 - C. The orbit approaches an attracting cycle of period 3.
 - D. The orbit approaches an attracting cycle of period 4.
 - E. I don't observe any periodic behavior.

Solution: The answer is **C**. There is an attracting cycle of period 3. In the long run the orbit cycles among the following values: 0.4904, 0.95915, 0.15039.

3. Suppose $r = 4.00$. What behavior do you observe?
 - A. The orbit approaches an attracting fixed point.
 - B. The orbit approaches an attracting cycle of period 2.
 - C. The orbit approaches an attracting cycle of period 3.
 - D. The orbit approaches an attracting cycle of period 4.
 - E. I don't observe any periodic behavior.

Solution: The answer is **E**. I will discuss this example at length in the next set of lectures.