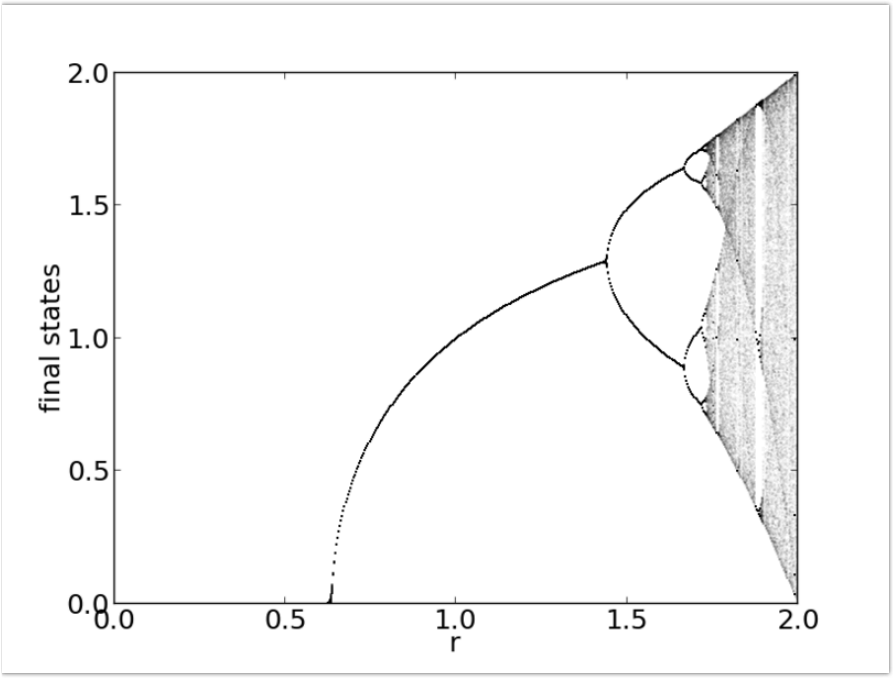
Instructions 1

You may use any course materials, videos, websites, calculators, etc. for this test. Just don't ask another person for the answers or s answers with other people. Please do not post questions about the test on the forum. If you have questions, please send them via er chaos@complexityexplorer.org. Thanks.

Question 2



The bifurcation diagram for an iterated function (not the logistic equation) is shown in the figure above. Which statement best descri long-term behavior of orbits of this dynamical system if r=1.0?

- The orbit approaches zero
- The orbit approaches a fixed point near x = 1.
- The orbit approaches a fixed point near x = 1.3.
- The orbit is periodic with period 2
- The orbit appears to be aperiodic.

Question 3

The bifurcation diagram for an iterated function (not the logistic equation) is shown in Question 1. Which statement best describes th behavior of orbits of this dynamical system if r=1.5?

- The orbit approaches zero
- The orbit approaches a fixed point near x= 1.
- The orbit approaches a fixed point near x = 1.3.
- The orbit is periodic with period two.
- The orbit appears to be aperiodic.

Question 4

The bifurcation diagram for an iterated function (not the logistic equation) is shown in Question 1. Which statement best describes th behavior of orbits of this dynamical system if r=1.9?

- The orbit approaches zero.
- The orbit approaches a fixed point at x = 1.
- The orbit approaches a fixed point near x = 1.3.
- The orbit is periodic with period two.
- The orbit appears to be aperiodic.

Question 5

Answer this question by using the web program that makes bifurcation diagrams for the logistic equation. Near r = 3.740 there is a p window. A bifurcation from period 5 to period 10 occurs near what r value?

- r = 3.738
- r = 3.741
- r = 3.743
- r = 3.745

Question 6

Answer this question by using the web program that makes bifurcation diagrams for the logistic equation. Near r = 3.702 there is a p window of what period?

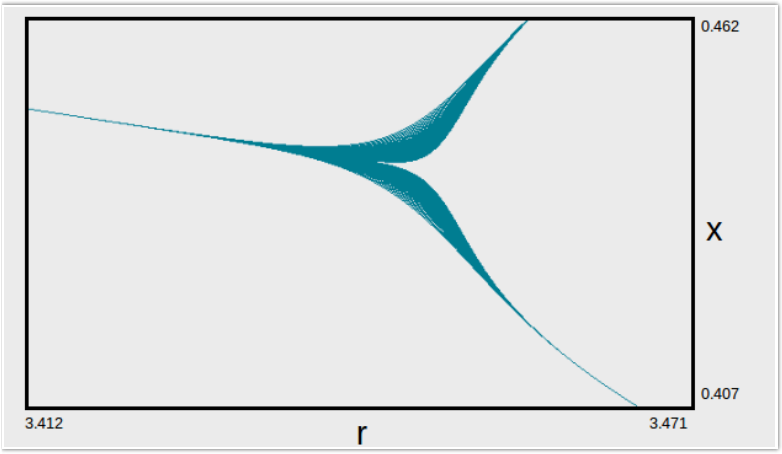
- 3
- 4
- 5
- 6
- 7

Question 7

Answer this question by using the web program that makes bifurcation diagrams for the logistic equation. Near r = 3.582 there is a p window of what period?

- 4
- 5
- 10
- 12
- 20

Question 8



Near a bifurcation, the bifurcation diagram often becomes "fuzzy" or blurry, as shown above. (This is a zoomed-in view of the transit period two to period four.) What is the cause of this blurring?

- The program is not plotting enough points.
- The attractor is very weakly attracting, so it takes the orbit a very long time to reach the attractor.
- Sensitive dependence on initial conditions.
- The shadowing lemma

Question 9

Near a bifurcation, the bifurcation diagram often becomes "fuzzy" or blurry, as shown above. (This is a zoomed-in view of the transit period two to period four.) To make the bifurcation diagram appear sharper, what should one do?

- Make the program plot more iterates
- Make the program skip more iterates before it starts plotting.