Unit 4 - Week 2

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2019-09-11, 23:59 IST.

In the following multiple choice questions (MCQs), choose (all) the correct answer(s).

1) Find all the fixed points of *1 point*

$$g(x) = | x - 1 |.$$

- [ ] 1
- [ ] 0
- [ ] 1/2
- [ ] All of them.

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/2

2) Find all fixed points in [0,1] for the given function *1 point*

$$h(x) = 4x(1 - x).$$

- [ ] 0
- [ ] 1
- [ ] 3/4
- [ ] 1/2

No, the answer is incorrect.
Score: 0
Accepted Answers:
0
3/4

3) All periodic points of *1 point*

$$h(x) = 3.2x(1 - x)$$

lies in the interval.

- [ ] [1,2]
- [ ] [-1,0]
- [ ] [0,1]
- [ ] [1,3.2]

No, the answer is incorrect.
Score: 0
Accepted Answers:
[0,1]

4) *1 point*

Consider the tent map, $T : [0, 1] \to [0, 1]$ defined by

$$T(x) = \begin{cases} \mu x & 0 \le x < \frac{1}{2} \\ \mu(1 - x) & \frac{1}{2} \le x < 1, \end{cases}$$

Define an iterative map by

$$x_{n+1} = T(x_n), \text{ where } x_n \in [0, 1]$$

Iterate the tent function numerically for $\mu = 2$. There is a period- two behaviour at the value of x_0

- ( ) 1/2
- ( ) 1/3
- ( ) 1/5
- ( ) 3/4

No, the answer is incorrect.
Score: 0
Accepted Answers:
1/5

5) *1 point*

For tent maps, there are no period-two points for $0 \le \mu \le 1$ and there are two points of period two for $1 < \mu \le 2$.

- ( ) True
- ( ) False

No, the answer is incorrect.
Score: 0
Accepted Answers:
True

6) Find the value of μ at which the logistic map $F_\mu(x) = \mu x(1 - x)$ *1 point*

has superstable fixed point.

- [ ] 0
- [ ] 1
- [ ] 2
- [ ] 1/2

No, the answer is incorrect.
Score: 0
Accepted Answers:
0
2

7) *1 point*

(The Bernoulli Shift Map) Consider the mapping $F : [0, 1] \to [0, 1]$ defined by

$$F(x) = 2x(mod 1).$$

If $x \in [0, 1]$ has the binary expansion

$$x = .s_1 s_2 ... = \sum_{j=1}^{\inf} \frac{s_j}{2^j}$$

with $s_j \in 0, 1$ for $j = 1, 2, 3, ...$, then which of the options are correct

- [ ] $F(x) = \cdot s_2 s_3 s_4 \ldots .$
- [ ] $F^n(x) = \cdot s_{n+1} s_{n+2} \ldots$ for $n \ge 0$.
- [ ] Fixed points of F^n are periodic orbits of F with period n.
- [ ] $F^{-1}(x)$ cannot be defined.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$F(x) = \cdot s_2 s_3 s_4 \ldots .$
$F^n(x) = \cdot s_{n+1} s_{n+2} \ldots$ for $n \ge 0$.
Fixed points of F^n are periodic orbits of F with period n.

8) In the Bernoulli shift F, (the overbar indicates that the sequence recurs) *1 point*

- [ ] $\cdot\overline{0}$ and $\cdot\overline{1}$ are fixed points for F
- [ ] $\cdot\overline{01}$ and $\cdot\overline{10}$ are fixed points of F^2
- [ ] $\cdot\overline{001}$,$\cdot\overline{011}$ and $\cdot\overline{111}$ are fixed points of F^3
- [ ] None of these.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\cdot\overline{0}$ and $\cdot\overline{1}$ are fixed points for F
$\cdot\overline{01}$ and $\cdot\overline{10}$ are fixed points of F^2

9) The proper Sharkovskii order for 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 is *1 point*

- ( ) $1 \triangleright 2 \triangleright 3 \triangleright 4 \triangleright 5 \triangleright 6 \triangleright 7 \triangleright 8 \triangleright 9 \triangleright 10$
- ( ) $2 \triangleright 4 \triangleright 6 \triangleright 8 \triangleright 10 \triangleright 3 \triangleright 5 \triangleright 7 \triangleright 9 \triangleright 1$
- ( ) $3 \triangleright 5 \triangleright 7 \triangleright 9 \triangleright 3.2 \triangleright 5.2 \triangleright 2^3 \triangleright 2^2 \triangleright 2 \triangleright 1$
- ( ) None of these.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$3 \triangleright 5 \triangleright 7 \triangleright 9 \triangleright 3.2 \triangleright 5.2 \triangleright 2^3 \triangleright 2^2 \triangleright 2 \triangleright 1$

10) The proper Sharkovskii order for 2,4,6,8,10,12 is *1 point*

- ( ) $12 \triangleright 10 \triangleright 8 \triangleright 6 \triangleright 4 \triangleright 2$
- ( ) $5.2 \triangleright 3.2 \triangleright 3.2^2 \triangleright 2^3 \triangleright 2^2 \triangleright 2$
- ( ) $2 \triangleright 4 \triangleright 6 \triangleright 8 \triangleright 10 \triangleright 12$
- ( ) None of these.

No, the answer is incorrect.
Score: 0
Accepted Answers:
$5.2 \triangleright 3.2 \triangleright 3.2^2 \triangleright 2^3 \triangleright 2^2 \triangleright 2$