Assignment 1

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

Pick the correct option from each question. There is no negative marking.

1) Suppose \( T : S^1 \to S^1 \) is an irrational rotation on unit circle \( S^1 \) circle with irrational \( 
\alpha \). Then:

- Every point is periodic point.
- Every orbit is an invariant set.
- There are countably many periodic points.
- There is no periodic point.

No, the answer is incorrect. Score: 0.
Accepted Answers:
- Every orbit is an invariant set.

2) For the map \( f: \mathbb{R} \to \mathbb{R} \) as \( f(x) = \frac{1}{3}(x^3 + x) \).

- \( W^u(0) = (-\infty, 3) \).
- \( W^u(1) = \{1\} \).
- \( W^s(-1) = (-\infty, \frac{1}{3}) \).
- \( W^s(-1) = (-1, -1) \).

No, the answer is incorrect. Score: 0.
Accepted Answers:
- \( W^u(1) = \{1\} \).

3) For the map \( f(\theta) = 2\theta \mod \theta \) on \( S^1 \).

- There are infinitely many periodic points.
- There are no fixed points.
- Backward orbit of every point converging to \( \theta = 0 \).
- There is no fixed point other than \( \theta = 2\pi n, n \in \mathbb{Z} \).

No, the answer is incorrect. Score: 0.
Accepted Answers:
- There are infinitely many periodic points.

4) Consider the map \( f(x) = x - x^3 \) on the real line \( \mathbb{R} \).

- There are two periodic points.
- \( W^u(0) = (0, 1) \).
- Orbit of \( -\frac{1}{2} \) is not convergent.
- There is no eventually periodic point.

No, the answer is incorrect. Score: 0.
Accepted Answers:
- Orbit of \( -\frac{1}{2} \) is not convergent.

5) Which of the following is/are true for the map \( f(x) = \sin x \) on the whole real line \( \mathbb{R} \):

- \( 0 \) is the attracting fixed point.
- There is an eventually periodic point except 0.
- There is a periodic point \( p \neq 0 \).
- There is a point \( p \) whose forward orbit is dense in \((-\frac{\pi}{2}, \frac{\pi}{2})\).

No, the answer is incorrect. Score: 0.
Accepted Answers:
- \( 0 \) is the attracting fixed point.

6) Which of the following is/are true for a hyperbolic periodic point \( p \):

- Always isolated.
- May not be isolated.
- Always non-isolated.
- \( p \) is always an attracting periodic point.

No, the answer is incorrect. Score: 0.
Accepted Answers:
- \( p \) is always an attracting periodic point.

7) Consider the quadratic map \( f(x) = x^2 - \frac{3}{4} \) on \( \mathbb{R} \). Then:

- \(-\frac{3}{4} \) is a hyperbolic fixed point.
- \( \frac{3}{4} \) is a repelling fixed point.
- Every neighbourhood of \( \frac{3}{4} \) lies within itself under every iteration of \( f \).
- There is no eventually periodic point.

No, the answer is incorrect. Score: 0.
Accepted Answers:
- \( \frac{3}{4} \) is a repelling fixed point.