

Assignment-3

- (1) In the set of real numbers, the set $(a, b) \subset \mathbb{R}$ is
- (a) Closed.
 - (b) Compact.
 - (c) Closed but not compact.
 - (d) Not compact.
- (2) In the set of real numbers (not extended real number system), the set $[0, \infty) \subset \mathbb{R}$ is
- (a) Closed and bounded.
 - (b) Closed but not bounded.
 - (c) Open and bounded.
 - (d) Open but not bounded.
- (3) Suppose A is a bounded set in \mathbb{R} , then closure of A
- (a) Closed but not bounded.
 - (b) Bounded but not closed.
 - (c) Compact.
 - (d) Open and bounded.
- (4) The sequence $\{s_n\}$, where $s_n = 1 + \frac{1}{\underline{1}} + \frac{1}{\underline{2}} + \frac{1}{\underline{3}} + \dots + \frac{1}{\underline{n}}$ is
- (a) Bounded above and increasing.
 - (b) Bounded below and decreasing.
 - (c) Neither increasing nor decreasing.
 - (d) Unbounded.
- (5) The derive set of the sequence $\{s_n\}$, where $s_n = \sin \frac{n\pi}{2} + \frac{(-1)^n}{n}$, $n \in \mathbb{N}$ is
- (a) $\{1, 0\}$.
 - (b) $\{1, 0, -1\}$.
 - (c) $\{-1, 0\}$.
 - (d) $\{1, -1\}$.
- (6) The sequence $\{s_n\}$, where $s_n = 1 + (-1)^n$, $n \in \mathbb{N}$ is
- (a) Periodic with period 1.
 - (b) Periodic with period 2.
 - (c) Not periodic.
 - (d) Convergent.

(7) $\lim_{n \rightarrow \infty} \frac{3 + 2\sqrt{n}}{\sqrt{n}}$

- (a) 1.
- (b) 2.
- (c) 3.
- (d) 5.

(8) If $\{a_n\}$ is a convergent sequence of real numbers satisfying $a_{n+1}^2 = 2a_n - 1$, then

- (a) $\lim_{n \rightarrow \infty} a_n = 2$.
- (b) $\lim_{n \rightarrow \infty} a_n = 1$.
- (c) $\lim_{n \rightarrow \infty} a_n = -1$.
- (d) $\lim_{n \rightarrow \infty} a_n = -2$.

(9) If $a > 0$, then $\lim_{n \rightarrow \infty} \sqrt[n]{a}$ is

- (a) 1 .
- (b) 2 .
- (c) $\sqrt{2}$.
- (d) 0 .

(10) $\lim_{n \rightarrow \infty} \sqrt[n]{n}$ is

- (a) 1 .
- (b) 2 .
- (c) Diverges to infinity
- (d) 0 .

Answers

- 1. (d)
- 2. (b)
- 3. (c)
- 4. (a)
- 5. (b)
- 6. (b)
- 7. (b)
- 8. (b)
- 9. (a)
- 10. (a)

