

F.Y.B.Sc. Sem 1 Maths Paper –I sample questions

1. $|x| = \max\{x, -x\}$ then

a. $x > |x|$

b. $x = 0$

c. $x = 1$

d. $x \leq |x|$

2. if $|x-2| < 1$ then $|x^2+3x+10|$ is less than

a. 2

b. -8

c. 8

d. -2

3. if $|x-8| < 1$ then $|x^2-10|$ is less than

a. 81

b. 49

c. -49

d. -81

4. if $|x+3| < 1$ then x belongs to

a. (6,8)

b. (-8,-6)

c. (-4,-2)

d. (2,4)

5. the sup and inf of set $s = \{x \in \mathbb{R}, |x+12| \leq 6\}$ respectively is

a. -18,-6

b. 22, 2

c. 2, 22

d. none of these

6. the upper and lower bound of sequence $x_n = (-1)^n$, $n \in \mathbb{N}$ is

- a. 1, 0
- b. 0, 1
- c. 1, -1
- d. -2, 2

7. the upper and lower bound of sequence $x_n = n^3 + n$, $n \in \mathbb{N}$ is

- a. no upper limit, 2
- b. no upper limit, 1
- c. 4, 1
- d. 2, 1

8. $\lim_{n \rightarrow \infty} \left(\frac{n^2 - 3n + 1}{n^2 + n + 2} \right)^1 = \dots$

- a. 4
- b. 3
- c. 1
- d. 0

9. $\lim_{n \rightarrow \infty} \left(\frac{2n^2 - 1}{3n^2 + n - 8} \right)^1 = \dots$

- a. 4/3
- b. 3
- c. 1/2
- d. 2/3

10. 5. sequence $x_n = \frac{3 - 5n^3}{n}$, $n \in \mathbb{N}$ is

- a. convergent
- b. diverges to $+\infty$
- c. diverges to $-\infty$
- d. none of these

11. sequence $x_n = \frac{2n}{n^3+1}$ converges to

- a. 0
- b. $1/n$
- c. 1
- d. none of these

12. The sequence $a_n = \frac{4+(-1)^n}{n}$ is

- a. monotonic and bounded
- b. . monotonic but not bounded
- c. . Not monotonic but bounded
- d. . neither monotonic nor bounded

13. $\lim_{n \rightarrow \infty} \frac{\log n^a}{n^b} = \dots$

- a. 1
- b. a
- c. n
- d. 0

14. which of the following is true?

- a. A convergent sequence is bounded
- b. A Cauchy sequence is bounded
- c. A convergent sequence is Cauchy
- d. All the above statement are true

15. A monotonic sequence in R

- a. must be bounded
- b. can not be bounded
- c. may or may not be bounded
- d. none of these

$$16. \lim_{n \rightarrow \infty} \left(\frac{3x^2 + 2x - 5}{6x^2 + 8x - 3} \right)^1 = \dots$$

- a. 0
- b. -1
- c. does not exist
- d. $\frac{1}{2}$

$$17. \lim_{n \rightarrow \infty} \left(\frac{1}{x^4} \right)^1 = \dots$$

- a. 0
- b. -1
- c. does not exist
- d. 1

$$18. \lim_{x \rightarrow 3} \frac{x-3}{x^3-27} = \dots$$

- a. 0
- b. 3
- c. does not exist
- d. $\frac{1}{27}$

$$19. \lim_{n \rightarrow \infty} \left(\frac{8x^2 - 5x + 4}{4x^2 + 1} \right)^1 = \dots$$

- a. 0
- b. 2
- c. does not exist
- d. 1

$$20. \lim_{x \rightarrow 0} \cos(x - \sin x) = \dots$$

- a. 0
- b. 1
- c. does not exist
- d. 1

cont.

21. $f(x) = x+8 \quad x < 2$

$= x-8 \quad x \geq 2$

Then f is

- a. continuous only at $x=2$
- b. discontinuous at $x=2$ the discontinuity is of the removable kind
- c. essential discontinuity at $x=2$
- d. discontinuity for $x \geq 2$

22. if f and g are real valued function defined on R such that $(f \cdot g)(x) = f(x) \cdot g(x)$ is continuous then

- a. f and g both are continuous
- b. f is continuous but g is not
- c. g is continuous but f is not
- d. f and g both need not be continuous

23. $f(x) = x - \frac{1}{x^2} - 1 \quad x \neq 1$

$= 0 \quad x = 1$

Then f is

- a. continuous only at $x=1$
- b. discontinuous at $x=1$ the discontinuity is of the removable kind
- c. discontinuous only at $x=1$
- d. discontinuity for $x \geq 1$

24. $f(x) = \frac{x^2 - 49}{x - 7} \quad x \neq 7$

$= k \quad x = 7$

Then f is continuous at $x=7$ if

- a. $k=3$
- b. $k=6$
- c. $k=9$
- d. $k=14$

$$25. f(x) = 1-x \quad x < 0$$
$$= 6 \quad x \geq 0$$

Then f is

- a. continuous only at $x=0$
- b. discontinuous at $x=0$ the discontinuity is of the removable kind
- c. discontinuous only at $x=0$
- d. discontinuity for $x \geq 0$