EMCF24 – Math 1432, 13209

The answer sheet for this assignment can be found by logging into CourseWare at http://www.casa.uh.edu, selecting Math 1432(13209), clicking on the EMCF tab at the top of the page, and selecting EMCF24.

1. Give the LUB of the sequence \( \left\{ 1 + \frac{(-1)^n}{n+2} \right\}_{n=1}^{\infty} \).
   a. 3
   b. 2
   c. 1
   d. 0
   e. DNE
   f. None of these.

2. Give the GLB of the sequence \( \left\{ 1 + \frac{(-1)^n}{n+2} \right\}_{n=1}^{\infty} \).
   a. 3
   b. 2
   c. 1
   d. 0
   e. DNE
   f. None of these.

3. The sequence \( \left\{ 1 + \frac{(-1)^n}{n+2} \right\}_{n=1}^{\infty} \) is
   a. Increasing
   b. Decreasing
   c. Bounded, but neither increasing nor decreasing
   d. None of these.

4. Give the LUB of the sequence \( \left\{ \frac{n^2 + n + 1}{2n^2 + 3n + 2} \right\}_{n=1}^{\infty} \).
   a. 0
   b. 1/3
   c. 1/2
   d. 1
   e. DNE
   f. None of these.
5. Give the GLB of the sequence \[ \left\{ \frac{n^2 + n + 1}{2n^2 + 3n + 2} \right\}_{n=1}^{\infty}. \]

a. 0
b. 1/3
c. 1/2
d. 1
e. DNE
f. None of these.

6. Describe the behavior of the sequence \[ \left\{ \frac{n^2 + n + 1}{2n^2 + 3n + 2} \right\}_{n=1}^{\infty}. \]

a. Increasing
b. Decreasing
c. Bounded, but neither increasing nor decreasing
d. None of these.

7. Give the limit of the sequence \[ \left\{ \left( 1 - \frac{3}{n} \right)^n \right\}_{n=1}^{\infty}. \]

a. \(e^3\)
b. DNE
c. 1
d. \(1/e^3\)
e. None of these.

8. Give the limit of the sequence \[ \left\{ \ln(4n + 2) - 2 \ln(\sqrt{n + 3}) \right\}_{n=1}^{\infty}. \]

a. DNE
b. 1
c. \(\ln(4)\)
d. \(\ln(1/4)\)
e. None of these.

9. Give the limit of the sequence \[ \left\{ \left( 1 + \frac{2}{n} \right)^{-n} \right\}_{n=1}^{\infty}. \]

a. 2
b. \(e^2\)
c. \(1/e^2\)
d. DNE
e. None of these.
10. Give the $y$ intercept of the tangent line to $\left(t^2 + t - 1, t + t^2\right)$ at the point (1,2).
   a. 0
   b. $\frac{1}{3}$
   c. $\frac{1}{2}$
   d. 1
   e. $\frac{3}{2}$
   f. None of these.

11. Give the area of the portion of polar graph $r = 1 + \sin(\theta)$ that lies below the $x$ axis.
   a. $\frac{3}{4}\pi - 2$
   b. $\frac{3}{4}\pi + 2$
   c. $\frac{3}{4}\pi - \frac{\sqrt{2}}{2}$
   d. $\frac{3}{4}\pi + \frac{\sqrt{2}}{2}$
   e. None of these.

12. Write the curve given parametrically by $\left(\cos(t), 2\sin(t)\right)$ as an equation in $x$ and $y$.
   a. $2x^2 - y^2 = 1$
   b. $2x^2 + y^2 = 1$
   c. $x^2 + \frac{y^2}{4} = 1$
   d. $\frac{x^2}{4} + y^2 = 1$
   e. None of these.

13. Write the curve given parametrically by $\left(e^t, 2e^{-t}\right)$ as an equation in $x$ and $y$.
   a. $y = \frac{2}{x}, x < 0$
   b. $y = \frac{2}{x}, x \geq 0$
   c. $y = \frac{2}{x}, x > 0$
   d. None of these.

14. Which of the following is true about the sequence $\left\{\ln\left(\frac{n + 3}{n + 1}\right)\right\}_{n=1}^{\infty}$.
   a. Increasing
   b. Decreasing
   c. Bounded, but neither increasing nor decreasing
   d. None of these.
15. Which of the following is true about the sequence \( \frac{2n+1}{3n-2} \) \( \lim_{n \to \infty} \)?
   a. Increasing
   b. Decreasing
   c. Bounded, but neither increasing nor decreasing
   d. None of these.

16. Which of the following is true about the sequence \( \frac{5n+3}{4-3n} \) \( \lim_{n \to \infty} \)?
   a. Increasing
   b. Decreasing
   c. Bounded, but neither increasing nor decreasing
   d. None of these.

17. Give the value below that is closest to the length of the curve \( (\cos(t), \sin(2t)) \).
   a. 9.39
   b. 9.41
   c. 9.43
   d. 9.45
   e. 9.47
   f. None of these.

18. Give the value below that is closest to the length of the curve \( y = 2x^{3/2} \) for \( 1 \leq x \leq 2 \).
   a. 3.77
   b. 3.78
   c. 3.79
   d. 3.80
   e. 3.81
   f. None of these.

19. The partial fraction decomposition of \( \frac{3x-1}{(x^2+1)(x-1)} \) has the form \( \frac{Ax+B}{x^2+1} + \frac{C}{x-1} \).
   Give the value of \( A + B + C \).
   a. 1
   b. -1
   c. 2
   d. -2
   e. None of these.
20. The substitution $x = 2 \sin(\theta)$ is used to compute the integral $\int f(x) \, dx$, and the result is $\sin(2\theta) + \cos(\theta) + C$. Give the answer in terms of $x$.

a. $(x-1)\sqrt{1-\frac{x^2}{4}} + C$

b. $(2x+1)\sqrt{1-\frac{x^2}{4}} + C$

c. $x\sqrt{1-\frac{x^2}{4}} + x + C$

d. $(x+1)\sqrt{1-\frac{x^2}{4}} + C$

e. None of these.