EMCF33 – 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 **EMCF33**.

Some important information:

- $\sum_{n=0}^{\infty} r^n = \frac{1}{1-r}$ if $|r| < 1$, and diverges if $|r| \geq 1$.
- $\sum_{n=0}^{N} r^n = \frac{1-r^{N+1}}{1-r}$ so long as $r \neq 1$.
- (Divergence Theorem): $\sum_{n=1}^{\infty} a_n$ diverges if a_n does not converge to 0 as $n \to \infty$.
- (Integral Test): If $a_n = f(n)$ and f is eventually nonincreasing, then $\sum_{n=1}^{\infty} a_n$ converges if and only if $\int_1^{\infty} f(x)\,dx < \infty$.
- (Comparison Test): Suppose $0 \leq a_n \leq b_n$ for n sufficiently large.
  If $\sum_{n=1}^{\infty} b_n$ converges then $\sum_{n=1}^{\infty} a_n$ converges.
  If $\sum_{n=1}^{\infty} a_n$ diverges then $\sum_{n=1}^{\infty} b_n$ diverges.

1. $\sum_{n=0}^{\infty} \frac{1}{2^n} =$
   a. 1/2
   b. 1
   c. 2
   d. 0
   e. DNE
   f. None of these.
2. $\sum_{n=3}^{\infty} \frac{1}{2^n} =$
   a. 1/4
   b. 1/2
   c. 1
   d. 2
   e. DNE
   f. None of these.

3. $\sum_{n=2}^{\infty} \frac{2^n}{3^n} =$
    a. 1/3
    b. 2/3
    c. 1
    d. 4/3
    e. DNE
    f. None of these.
4. $\sum_{n=2}^{\infty} \frac{\cos(n\pi)}{3^n} =$
    a. 1/48
    b. 1/24
    c. 1/12
    d. 1/6
    e. DNE
    f. None of these.
5. $\sum_{n=2}^{\infty} \frac{4^{n+1}}{3^{n+3}} =$
    a. 1/3
    b. 3/4
    c. 4/3
    d. 7/3
    e. DNE
    f. None of these.
6. $\sum_{n=2}^{\infty} \frac{1}{n^2+n} =$ (Hint: Use partial fraction decomposition to help find a value for the terms in the sequence of partial sums.)
    a. 2
    b. 1
    c. 1/2
    d. 0
    e. DNE
    f. None of these.
7. $\sum_{n=2}^{\infty} \frac{1}{n^2+3n+2} =$ (Hint: Use partial fraction decomposition to help find a value for the terms in the sequence of partial sums.)
    a. 3/2
    b. 1
    c. 1/2
    d. 1/3
    e. DNE
    f. None of these.

8. Give S_8 for the series $\sum_{n=3}^{\infty} \frac{1}{2^n}$.
    a. 63/256
    b. 511/2048
    c. 255/1024
    d. 127/512
    e. 255/256
    f. None of these.
9. Give a formula for S_N for the series $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$.
    a. $1+\frac{1}{N+1}$
    b. $1-\frac{2}{N}$
    c. $1+\frac{1}{N}$
    d. $1-\frac{1}{N+1}$
    e. $1-\frac{2}{N+1}$
    f. None of these.
10. The series $\sum_{n=1}^{\infty} \frac{1}{n}$
    a. converges
    b. diverges
    c. None of these.
11. $\sum_{n=1}^{\infty} \frac{1}{n^2}$
    a. Converges
    b. Diverges
    c. None of these.
12. $\sum_{n=2}^{\infty} \frac{1}{\sqrt{n}}$
    a. Converges
    b. Diverges
    c. None of these.
13. $\sum_{n=3}^{\infty} \frac{2n+1}{n^3+3}$
    a. Converges
    b. Diverges
    c. None of these.

14. $\sum_{n=1}^{\infty} \frac{5n^{3/2}+2n}{n^3+3}$
    a. Converges
    b. Diverges
    c. None of these.
15. $\sum_{n=2}^{\infty} \frac{1}{n\,\ln(n)}$
    a. Converges
    b. Diverges
    c. None of these.
16. $\sum_{n=5}^{\infty} \frac{1}{n\,(\ln(n))^2}$
    a. Converges
    b. Diverges
    c. None of these.
17. $\sum_{n=2}^{\infty} \frac{1}{n^2+1}$
    a. Converges
    b. Diverges
    c. None of these.
18. $\sum_{n=2}^{\infty} \frac{\ln(n)}{n^2+2}$ (Hint: If $\varepsilon > 0$ then $\ln(n) \le n^{\varepsilon}$ for large values of n.)
    a. Converges
    b. Diverges
    c. None of these.
19. $\sum_{n=2}^{\infty} \frac{2n+1}{10^8\,n^2+3n+16}$
    a. Converges
    b. Diverges
    c. None of these.
20. $\sum_{n=2}^{\infty} \frac{n}{2^n}$ (Hint: $2^n > n^3$ for large values of n.)
    a. Converges
    b. Diverges
    c. None of these.