EMCF32 – 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 **EMCF32**.

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 $r \neq 1$.
- $\sum_{n=0}^{\infty} \frac{1}{n^p}$ converges if and only if $p > 1$.
- (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.
- (Limit Comparison Test): Suppose $0 \leq a_n$, $0 \leq b_n$ for n sufficiently large.
  If a_n behaves like b_n (in the limit as $n \to \infty$),
  then $\sum_{n=1}^{\infty} b_n$ converges if and only if $\sum_{n=1}^{\infty} a_n$ converges.

1. $\sum_{n=2}^{\infty} \frac{2^n - 2}{3^n} =$
   a. 2/3
   b. 3/2
   c. 1
   d. 7/6
   e. DNE
   f. None of these.

2. $\sum_{n=3}^{\infty} \frac{e^n}{1000\ 2^n} =$
    a. 3/2
    b. 2/3
    c. 3/2000
    d. 2/3000
    e. DNE
    f. None of these.
3. $\sum_{n=4}^{\infty} \frac{1}{n+1}$
    a. Converges
    b. Diverges
    c. None of these.
4. $\sum_{n=1}^{\infty} \frac{2n+1}{7n^2+6n+2}$
    a. Converges
    b. Diverges
    c. None of these.
5. $\sum_{n=2}^{\infty} \frac{1}{\sqrt{n}}$
    a. Converges
    b. Diverges
    c. None of these.
6. $\sum_{n=3}^{\infty} \frac{3n+1}{2n^3+4}$
    a. Converges
    b. Diverges
    c. None of these.
7. $\sum_{n=1}^{\infty} \frac{5n^{3/2}+2n}{n^3+3}$
    a. Converges
    b. Diverges
    c. None of these.
8. $\sum_{n=2}^{\infty} \frac{1}{n\ \ln(n)}$
    a. Converges
    b. Diverges
    c. None of these.

9. $\sum_{n=5}^{\infty} \frac{1}{n\left(\ln(n)\right)^2}$
   a. Converges
   b. Diverges
   c. None of these.
10. $\sum_{n=2}^{\infty} \frac{\arctan(n)}{n^2+1}$
   a. Converges
   b. Diverges
   c. None of these.
11. $\sum_{n=2}^{\infty} \frac{2^n}{n^2+2}$
   a. Converges
   b. Diverges
   c. None of these.
12. $\sum_{n=2}^{\infty} \frac{2n+1}{n^{5/2}+3n+16}$
   a. Converges
   b. Diverges
   c. None of these.
13. $\sum_{n=2}^{\infty} \frac{10n+1}{3^n}$
   a. Converges
   b. Diverges
   c. None of these.
14. $\sum_{n=7}^{\infty} \frac{n\ln(n)}{2n^4+3}$
   a. Converges
   b. Diverges
   c. None of these.
15. $\sum_{n=2}^{\infty} \frac{n!}{3^n}$
   a. Converges
   b. Diverges
   c. None of these.
16. $\sum_{n=2}^{\infty} \frac{n!}{(n+2)!}$
   a. Converges
   b. Diverges
   c. None of these.

17. $\sum_{n=1}^{\infty} \frac{5+\cos(10n)}{\sqrt{n}}$
    a. Converges
    b. Diverges
    c. None of these.
18. $\sum_{n=3}^{\infty} \frac{n^2+3}{12n^{7/2}+2n+3}$
    a. Converges
    b. Diverges
    c. None of these.
19. $\sum_{n=2}^{\infty} \frac{2^n}{n^7+2n^6+1}$
    a. Converges
    b. Diverges
    c. None of these.
20. $\sum_{n=2}^{\infty} \left(1-\frac{2}{n}\right)^n$
    a. Converges
    b. Diverges
    c. None of these.