Math 2012 Quiz 3 Practice Spring 2008

Name: Last _____, First _____

You must show all work to get credit for the problems. NO work or explanations – no credit.

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Solve the problem.

1) At a plant that packages bottled spring water, the water is passed through a sequence of ion–exchange filters to reduce the sodium content prior to bottling. Each filter removes 21% of the sodium present in the water passing through it. Determine the number of filters that must be used to reduce the sodium concentration from 21 parts–per–million to 0.96 parts–per–million. 1) _____

A) 13 B) 12 C) 11 D) 10

Write the first four elements of the sequence.

2) $\left(1+\frac{1}{n}\right)^n$ 2) _____

A) $0, 1, \frac{9}{4}, \frac{64}{27}$ B) $0, 2, \frac{9}{4}, \frac{64}{27}$ C) $1, \frac{9}{4}, \frac{64}{27}, \frac{625}{64}$ D) $2, \frac{9}{4}, \frac{64}{27}, \frac{625}{256}$

A recursion formula and the initial term(s) of a sequence are given. Write out the first five terms of the sequence.

3) $a_1 = 1, a_{n+1} = \frac{na_n}{n+5}$ 3) _____

A) $1, \frac{1}{6}, \frac{7}{6}, \frac{7}{48}, \frac{63}{480}$ B) $1, \frac{1}{6}, \frac{2}{42}, \frac{3}{336}, \frac{4}{3024}$

C) $1, \frac{1}{6}, \frac{2}{42}, \frac{6}{336}, \frac{24}{3024}$ D) $1, \frac{1}{6}, \frac{2}{7}, \frac{6}{8}, \frac{24}{9}$

Find a formula for the nth partial sum of the series and use it to find the series' sum if the series converges.

4) $8 - \frac{8}{3} + \frac{8}{9} - \frac{8}{27} + \ldots + (-1)^{n-1}\frac{8}{3^{n-1}} + \ldots$ 4) _____

A) $\frac{8\left(1-\frac{1}{(-3)^n}\right)}{1+\frac{1}{3}}; 12$ B) $\frac{8\left(1-\frac{1}{(-3)^n}\right)}{1+\frac{1}{3}}; 6$

C) $\frac{8\left(1-\frac{1}{(-3)^{n-1}}\right)}{1+\frac{1}{3}}; 12$ D) $\frac{8\left(1-\frac{1}{(-3)^{n-1}}\right)}{1+\frac{1}{3}}; 6$

Find the sum of the geometric series for those x for which the series converges.

5) $\sum_{n=0}^{\infty}(-1)^n\left(\frac{x-9}{7}\right)^n$ 5) _____

A) $\frac{7}{2+x}$ B) $\frac{7}{2-x}$ C) $\frac{7}{-2-x}$ D) $\frac{7}{-2+x}$

Find the values of x for which the geometric series converges.

6) $\sum_{n=0}^{\infty} (4x + 1)^n$ 6) _____

A) $-\frac{1}{4} < x < \frac{1}{4}$ B) $0 < x < \frac{1}{4}$ C) $-\frac{1}{2} < x < 0$ D) $0 < x < \frac{1}{2}$

Change the repeating decimal to a fraction.

7) 0.149149 . . . 7) _____

A) $\frac{1490}{999}$ B) $\frac{149}{999}$ C) $\frac{149}{99}$ D) $\frac{1490}{99}$

Use the integral test to determine whether the series converges.

8) $\sum_{n=1}^{\infty} \frac{\cos 1/n}{n^2}$ 8) _____

A) diverges B) converges

9) $\sum_{n=1}^{\infty} \frac{3n}{n^2 + 3}$ 9) _____

A) converges B) diverges

Use the direct comparison test to determine if the series converges or diverges.

10) $\sum_{n=1}^{\infty} \frac{4 + 9 \cos n}{n^3}$ 10) _____

A) Diverges B) Converges

11) $\sum_{n=1}^{\infty} \frac{1}{n^2 \ln n + 6}$ 11) _____

A) Diverges B) Converges

Use the limit comparison test to determine if the series converges or diverges.

12) $\sum_{n=1}^{\infty} \frac{1}{6 + 5n \ln n}$ 12) _____

A) Diverges B) converges

Use the ratio test to determine if the series converges or diverges.

13) $\sum_{n=1}^{\infty} \frac{6^n}{n!}$ 13) _____

A) Converges B) Diverges

Use the root test to determine if the series converges or diverges.

14) $\sum_{n=1}^{\infty} \frac{(n!)^n}{\left(n^n\right)^8}$ 14) _____

A) Converges B) Diverges

15) $\sum_{n=1}^{\infty} \left(\frac{1}{n^5} - \frac{1}{n^9}\right)^n$ 15) _____

A) Diverges B) Converges

Use the ratio test to determine if the series converges or diverges.

16) $\sum_{n=1}^{\infty} \frac{(2n)!}{3^n (n!)^2}$ 16) _____

A) Diverges B) Converges

Use the root test to determine if the series converges or diverges.

17) $\sum_{n=1}^{\infty} \left(\frac{9n^{1/n} - 1}{6n^{1/n} - 1}\right)^n$ 17) _____

A) Converges B) Diverges

Determine convergence or divergence of the alternating series.

18) $\sum_{n=1}^{\infty} (-1)^n \ln\left[\frac{3n+7}{3n+6}\right]$ 18) _____

A) Converges B) Diverges

19) $\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{4/3}}$ 19) _____

A) Converges B) Diverges

20) $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n+\sqrt{n}}{n^2+1}$ 20) _____

A) Converges B) Diverges

Determine either absolute convergence, conditional convergence or divergence for the series.

21) $\sum_{n=1}^{\infty} (-1)^n \left(\frac{1}{2} - \frac{2}{n}\right)^n$ 21) _____

A) Converges absolutely B) Converges conditionally C) Diverges

Find the interval of convergence of the series.

22) $\sum_{n=0}^{\infty} \frac{(x-4)^n}{n^4 4^n}$ 22) _____

A) $-8 < x < 8$ B) $0 \le x \le 8$ C) $x < 8$ D) $3 \le x \le 5$

23) $\sum_{n=1}^{\infty} \frac{(x-1)^n}{\ln(n+6)}$ 23) _____

A) $0 < x < 2$ B) $0 \le x < 2$ C) $-\infty < x < \infty$ D) $x < 2$

24) $\sum_{n=1}^{\infty} \frac{(x-7)^n}{(3n)!}$ 24) _____

A) $6 \le x \le 8$ B) $1 \le x \le 13$ C) $x \le 8$ D) $-\infty < x < \infty$

Find the sum of the series as a function of x.

25) $\sum_{n=1}^{\infty} (x-5)^n$ 25) _____

A) $-\frac{x-5}{x-6}$ B) $-\frac{x-5}{x-4}$ C) $\frac{x-5}{x-4}$ D) $\frac{x-5}{x-6}$

26) $\sum_{n=0}^{\infty} \left(\frac{x^2+3}{4}\right)^n$ 26) _____

A) $-\frac{4}{x^2+1}$ B) $\frac{4}{x^2+1}$ C) $-\frac{4}{x^2-1}$ D) $\frac{4}{x^2-1}$

Find the Taylor polynomial of order 3 generated by f at a.

27) $f(x) = \frac{1}{x+6}$, $a = 0$ 27) _____

A) $\frac{1}{6} - \frac{x}{36} + \frac{x^2}{216} - \frac{x^3}{1296}$ B) $\frac{x}{6} + \frac{x^2}{36} + \frac{x^3}{216} + \frac{x^4}{1296}$

C) $\frac{1}{6} + \frac{x}{36} + \frac{x^2}{216} + \frac{x^3}{1296}$ D) $\frac{x}{6} - \frac{x^2}{36} + \frac{x^3}{216} - \frac{x^4}{1296}$

28) $f(x) = \ln(x+1)$, $a = 4$ 28) _____

A) $\ln 5 + \frac{x-4}{5} - \frac{(x-4)^2}{50} + \frac{(x-4)^3}{375}$ B) $\ln 3 - \frac{x-4}{3} + \frac{(x-4)^2}{18} - \frac{(x-4)^3}{81}$

C) $\ln + \frac{x-4}{3} + \frac{(x-4)^2}{18} + \frac{(x-4)^3}{81}$ D) $\ln 5 - \frac{x-4}{5} + \frac{(x-4)^2}{50} - \frac{(x-4)^3}{375}$

Find the Maclaurin series for the given function.

29) e^{6x} 29) _____

A) $\sum_{n=1}^{\infty} \frac{6^n x^n}{n!}$

B) $\sum_{n=0}^{\infty} \frac{6^n x^n}{n!}$

C) $\sum_{n=0}^{\infty} \frac{(-1)^n 6^n x^n}{n!}$

D) $\sum_{n=1}^{\infty} \frac{(-1)^n 6^n x^n}{n!}$

30) $\sin 7x$ 30) _____

A) $\sum_{n=0}^{\infty} \frac{(-1)^n 7^{2n+1} x^{2n+1}}{n!}$

B) $\sum_{n=0}^{\infty} \frac{(-1)^n 7^{2n+1} x^{2n+1}}{(2n+1)!}$

C) $\sum_{n=0}^{\infty} \frac{(-1)^{2n+1} 7^{2n+1} x^{2n+1}}{(2n+1)!}$

D) $\sum_{n=0}^{\infty} \frac{(-1)^{2n+1} 7^{2n+1} x^{2n+1}}{n!}$

Answer Key
Testname: MATH-2012-QUIZ3-PRACTICE-SP08

1) A
2) D
3) C
4) B
5) D
6) C
7) B
8) B
9) B
10) B
11) B
12) A
13) A
14) B
15) B
16) A
17) B
18) A
19) A
20) A
21) A
22) B
23) B
24) D
25) A
26) C
27) A
28) A
29) B
30) B