This print-out should have 40 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

version 728

CalC12c04a

55:03, calculus3, multiple choice, > 1 min, wording-variable.

001

Determine which of the following series are convergent:

A. $1+\frac{1}{4}+\frac{1}{9}+\frac{1}{16}+\ldots$

B. $\sum_{n=1}^{\infty} \frac{3}{n^2+1}$

C. $\sum_{n=1}^{\infty} \frac{2}{n^{3/2}}$

1. C only

2. A and C only

3. all of them

4. none of them

5. B and C only

6. A only

7. B only

8. A and B only

CalC12c15s

55:03, calculus3, multiple choice, < 1 min, wording-variable.

002

Determine whether the series

$$\sum_{n=1}^{\infty} \frac{1}{n^2+4}$$

converges or diverges.

1. series diverges

2. series converges

CalC12c20a

55:03, calculus3, multiple choice, < 1 min, wording-variable.

003

Determine whether the series

$$\sum_{m=1}^{\infty} \frac{3\ln(4m)}{m^2}$$

is convergent or divergent.

1. series converges

2. series diverges

CalC12d15s

55:04, calculus3, multiple choice, > 1 min, wording-variable.

004

Determine whether the series

$$\sum_{k=1}^{\infty} \frac{6+\cos k}{2^k}$$

converges or diverges.

1. series is convergent

2. series is divergent

CalC12d19b

55:04, calculus3, multiple choice, > 1 min, wording-variable.

005

Which of the following infinite series converges?

1. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{5n}{7n+4}\right)^n$
2. $\displaystyle\sum_{n=1}^{\infty}\frac{7}{5n-4}$
3. $\displaystyle\sum_{k=2}^{\infty}\frac{4}{7k\ln k+5k}$
4. $\displaystyle\sum_{n=1}^{\infty}\frac{5n^n}{(n+5)^n}$
5. $\displaystyle\sum_{n=1}^{\infty}\left(\frac{5}{4}\right)^n$

CalC12d34b

55:04, calculus3, multiple choice, > 1 min, wording-variable.

006

Which of the following series converge(s)?

(A) $\displaystyle\sum_{k=2}^{\infty}\frac{4k+3}{(k\ln k)^2+6}$

(B) $\displaystyle\sum_{n=1}^{\infty}\frac{\sqrt{n}-7}{\sqrt{n}+3}$

(C) $\displaystyle\sum_{n=1}^{\infty}\left(\frac{7n+3}{6n-4}\right)^n$

1. C only
2. none of A, B, or C
3. A, B, and C
4. B and C
5. A and C
6. B only
7. A and B
8. A only

CalC12e05s

55:05, calculus3, multiple choice, > 1 min, normal.

007

Which one of the following series is convergent?

1. $\displaystyle\sum_{n=1}^{\infty}\frac{3}{5+\sqrt{n}}$
2. $\displaystyle\sum_{n=1}^{\infty}\frac{(-1)^{n-1}}{1+\sqrt{n}}$
3. $\displaystyle\sum_{n=1}^{\infty}(-1)^{n-1}\frac{1+\sqrt{n}}{5+\sqrt{n}}$
4. $\displaystyle\sum_{n=1}^{\infty}(-1)^{2n}\frac{5}{3+\sqrt{n}}$
5. $\displaystyle\sum_{n=1}^{\infty}(-1)^{3}\frac{5}{3+\sqrt{n}}$

CalC12f04a

55:06, calculus3, multiple choice, < 1 min, normal.

008

Determine whether the series

$$\frac{4}{8}-\frac{4}{9}+\frac{4}{10}-\frac{4}{11}+\frac{4}{12}-\ldots$$

is conditionally convergent, absolutely convergent, or divergent.

1. absolutely convergent
2. series is divergent
3. conditionally convergent

CalC12f09s

55:06, calculus3, multiple choice, $<$ 1 min, wording-variable.

009

Which one of the following properties does the series

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

have?

1. divergent

2. absolutely convergent

3. conditionally convergent

CalC12f10s

55:06, calculus3, multiple choice, $>$ 1 min, wording-variable.

010

Which one of the following properties does the series

$$\sum_{n=1}^{\infty} 2^{-n}\, n!$$

have?

1. absolutely convergent

2. conditionally convergent

3. divergent

CalC12f33b

55:06, calculus3, multiple choice, $<$ 1 min, wording-variable.

011

Decide which of the following series converge(s)

$$(A) \quad \sum_{n=1}^{\infty} \frac{n^8}{n+3}\left(\frac{3}{8}\right)^n$$

$$(B) \quad \sum_{n=1}^{\infty} \frac{\sqrt{n}-4}{\sqrt{n}+5}\left(\frac{5}{4}\right)^n$$

$$(C) \quad \sum_{n=1}^{\infty} \left(\frac{4n+5}{n^3+8}\right)^n$$

1. C only

2. A and B

3. B only

4. all of them

5. A and C

CalC12h05s

55:08, calculus3, multiple choice, $>$ 1 min, normal.

012

Find the interval of convergence of the series

$$\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{4n^2+5}\,.$$

1. converges only at $x = 0$

2. interval of cgce $= [-1, 1]$

3. interval of cgce $= [-1, 1)$

4. interval of cgce $= [-4, 5]$

5. interval of cgce $= (-4, 5]$

6. interval of cgce $= (-1, 1]$

CalC12i03c

55:09, calculus3, multiple choice, $<$ 1 min, wording-variable.

013

Find a power series representation for the function

$$f(z) = \frac{1}{z-2}.$$

1. $f(z) = \sum_{n=0}^{\infty} (-1)^{n-1}2^{n+1}\, z^n$

2. $f(z) = \sum_{n=0}^{\infty} (-1)^n 2^n\, z^n$

3. $f(z) = -\sum_{n=0}^{\infty} \frac{1}{2^{n+1}}\, z^n$

4. $f(z) = -\sum_{n=0}^{\infty} 2^n\, z^n$

5. $f(z) = \sum_{n=0}^{\infty} \frac{1}{2^{n+1}}\, z^n$

CalC12i21a

55:09, calculus3, multiple choice, > 1 min, wording-variable.

014

Find a power series representation for the function

$$f(y) = \ln\sqrt{\frac{1+4y}{1-4y}}.$$

(*Hint*: remember properties of logs.)

1. $f(y) = \sum_{n=1}^{\infty} \frac{4^{2n-1}}{2n-1}\, y^{2n-1}$

2. $f(y) = \sum_{n=1}^{\infty} \frac{(-1)^n 4^{2n}}{2n-1}\, y^{2n-1}$

3. $f(y) = \sum_{n=1}^{\infty} \frac{1}{2n-1}\, y^{2n-1}$

4. $f(y) = \sum_{n=1}^{\infty} \frac{1}{2n}\, y^{2n}$

5. $f(y) = \sum_{n=1}^{\infty} \frac{4^{2n}}{2n-1}\, y^{2n}$

CalC12f33a

55:06, calculus3, multiple choice, < 1 min, wording-variable.

015

Determine which, if any, of the following series diverge.

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

(B) $\sum_{n=1}^{\infty} \frac{2^n}{(n+3)^n}$

(C) $\sum_{n=1}^{\infty} \left(\frac{2n}{n+2}\right)^n \left(\frac{2}{3}\right)^n$

1. B only

2. A and C

3. all of them

4. A and B

5. A only

6. B and C

7. none of them

8. C only

CalC12j11s

55:10, calculus3, multiple choice, > 1 min, wording-variable.

016

Find the Taylor series representation for f centered at $x = 1$ when

$$f(x) = 4 + x - 4x^2.$$

1. $f(x) = 1 - 7(x-1) - 4(x-1)^2$

2. $f(x) = 1 + (x-1) + 4(x-1)^2$

3. $f(x) = 4 + (x-1) - 8(x-1)^2$

4. $f(x) = 1 - 7(x-1) - 8(x-1)^2$

5. $f(x) = 4 - 7(x-1) + 8(x-1)^2$

6. $f(x) = 4 + (x-1) - 4(x-1)^2$

CalC12j14a

55:10, calculus3, multiple choice, < 1 min, wording-variable.

017

Find the degree three Taylor polynomial T_3 centered at $x = 0$ for f when

$$f(x) = 2\ln(3-2x)\,.$$

1. $T_3(x) = 2\ln 3 + \dfrac{4}{3}x - \dfrac{4}{9}x^2 + \dfrac{8}{81}x^3$

2. $T_3(x) = \dfrac{4}{3}x - \dfrac{4}{9}x^2 + \dfrac{16}{81}x^3$

3. $T_3(x) = 2\ln 3 - \dfrac{4}{3}x - \dfrac{4}{9}x^2 - \dfrac{16}{81}x^3$

4. $T_3(x) = 2\ln 3 - \dfrac{4}{3}x + \dfrac{4}{9}x^2 - \dfrac{16}{81}x^3$

5. $T_3(x) = \ln 3 - \dfrac{4}{3}x - \dfrac{4}{9}x^2 - \dfrac{16}{81}x^3$

CalC12l31b

55:10, calculus3, multiple choice, < 1 min, normal.

018

The demand x for computers at a price of $\$p$ is given by the Demand-price function

$$p = D(x) = 144\Big(64 - x^2\Big)^{1/2}$$

where $0 \le x \le 8$. Use the degree two Taylor polynomial for D centered at $x = 0$ to calculate an approximate value for the average price $\overline{p}$ (in dollars) over the demand interval $[0, 3]$.

1. $\overline{p} \sim \$1105$

2. $\overline{p} \sim \$1085$

3. $\overline{p} \sim \$1095$

4. $\overline{p} \sim \$1115$

5. $\overline{p} \sim \$1125$

CalC12a24a

55:01, calculus3, multiple choice, > 1 min, wording-variable.

019

Determine if the sequence $\{a_n\}$ converges, when

$$a_n = 9\cos\left(\frac{6\,n\,\pi + 4}{18\,n + 8}\right),$$

and if it does, find its limit.

1. limit $= 9\cos\dfrac{1}{2}$

2. sequence does not converge

3. limit $= \dfrac{9}{2}\sqrt{3}$

4. limit $= \dfrac{9}{2}$

5. limit $= \cos\dfrac{1}{2}$

6. limit $= 3\,\pi$

CalC12a17c

55:01, calculus3, multiple choice, > 1 min, wording-variable.

020

Determine if the sequence $\{a_n\}$ converges when

$$a_n = \frac{n^{3\,n}}{(n-2)^{3\,n}},$$

and if it does, find its limit

1. limit $= e^{-\frac{2}{3}}$

2. limit $= 1$

3. limit $= e^{\frac{2}{3}}$

4. sequence diverges

5. limit $= e^{6}$

6. limit $= e^{-6}$

CalC12a31s

55:01, calculus3, multiple choice, > 1 min, wording-variable.

021

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = \frac{2+\cos^2 n}{3+2^n}.$$

1. converges with limit $= \dfrac{1}{2}$

2. converges with limit $= 2$

3. converges with limit $= \dfrac{2}{3}$

4. converges with limit $= 0$

5. diverges

CalC12b32b

55:02, calculus3, multiple choice, > 1 min, fixed.

022

Find the sum of the infinite series

$$\sum_{k=1}^{\infty} (\cos^2\theta)^k$$

whenever the series converges.

1. sum $= \cot^2\theta$

2. sum $= \tan^2\theta$

3. sum $= \sec^2\theta$

4. sum $= \sin^2\theta\cos^2\theta$

5. sum $= \csc^2\theta$

CalC12g01exam1

55:06, calculus3, multiple choice, > 1 min, wording-variable.

023

Determine which, if any, of the series

A. $\displaystyle\sum_{m=3}^{\infty} \frac{m+3}{m^2\ln m+2}$

B. $1+\dfrac{1}{2}+\dfrac{1}{4}+\dfrac{1}{8}+\dfrac{1}{16}+\dots$

are convergent.

1. neither of them

2. both of them

3. A only

4. B only

CalC12g03exam

55:06, calculus3, multiple choice, > 1 min, wording-variable.

024

Determine which, if any, of the series

A. $\displaystyle\sum_{k=1}^{\infty} \frac{k+2}{k\,3^k}$

B. $\sum_{n=2}^{\infty} \frac{3\sqrt{n}}{n\sqrt{n}-2}$

are convergent.

1. A only

2. both of them

3. neither of them

4. B only

CalC12g01a

55:06, calculus3, multiple choice, > 1 min, wording-variable.

025

Which, if any, of the following statements are true?

A. If $\sum a_n$ is divergent, then $\sum |a_n|$ is divergent.

B. If $\sum a_n$ converges, then $\lim_{n\to\infty} a_n = 0$.

C. The Ratio Test can be used to determine whether $\sum 1/n!$ converges.

1. A and B only

2. C only

3. B and C only

4. none of them

5. A and C only

6. all of them

7. A only

8. B only

CalC12h30a

55:08, calculus3, multiple choice, > 1 min, wording-variable.

026

If the series

$$\sum_{n=0}^{\infty} c_n x^n$$

converges when $x = -4$ and diverges when $x = 5$, which of the following series converge without further restrictions on $\{c_n\}$?

A. $\sum_{n=0}^{\infty} c_n 8^n$

B. $\sum_{n=0}^{\infty} (-1)^n c_n 9^n$

C. $\sum_{n=0}^{\infty} c_n (-4)^{n+1}$

1. C only

2. A and B only

3. A only

4. B only

5. B and C only

6. all of them

7. A and C only

8. none of them

CalC12j17a

55:10, calculus3, multiple choice, > 1 min, wording-variable.

027

Find the degree three Taylor polynomial T_3 centered at $x = 0$ for f when

$$f(x) = \frac{1}{(4x+1)^{1/2}}.$$

1. $T_3(x) = x - 2x^2 - 20x^3$

2. $T_3(x) = 1 + 2x - 6x^2 + 20x^3$

3. $T_3(x) = 1 - 2x + 12x^2 - 120x^3$

4. $T_3(x) = 1 + 2x - 2x^2 - 20x^3$

5. $T_3(x) = x + 6x^2 + 20x^3$

6. $T_3(x) = 1 - 2x + 6x^2 - 20x^3$

CalC12a17s

55:01, calculus3, multiple choice, < 1 min, wording-variable.

028

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = \frac{3 - 4n^2}{n + 3n^2},$$

and if it converges, find the limit.

1. converges with limit $= 3$

2. converges with limit $= -\frac{1}{4}$

3. converges with limit $= -\frac{4}{3}$

4. diverges

5. converges with limit $= 0$

CalC12a28s

55:01, calculus3, multiple choice, > 1 min, wording-variable.

029

Determine whether the sequence $\{a_n\}$ converges or diverges when

$$a_n = \frac{\ln(3n^2)}{\ln(5n^3)},$$

and if it converges, find the limit.

1. converges with limit $= 0$

2. converges with limit $= \frac{3}{5}$

3. diverges

4. converges with limit $= \frac{\ln 3}{\ln 5}$

5. converges with limit $= \frac{2}{3}$

CalC12b32f

55:02, calculus3, multiple choice, > 1 min, fixed.

030

Find the sum of the infinite series

$$\tan^2\theta - \tan^4\theta + \tan^6\theta + \ldots + (-1)^{n-1}\tan^{2n}\theta + \ldots$$

whenever the series converges.

1. sum $= \cos^2\theta$

2. sum $= \tan^2\theta$

3. sum $= \sin^2\theta$

4. sum $= -\cos^2\theta$

5. sum $= -\sin^2\theta$

CalC12b49a

55:02, calculus3, multiple choice, > 1 min, wording-variable.

031

Find the n^{th} term, a_n, of an infinite series $\sum_{n=1}^{\infty} a_n$ when the n^{th} partial sum, S_n, of the series is given by

$$S_n = \frac{n}{n+1}.$$

1. $a_n = \dfrac{1}{n(n+1)}$

2. $a_n = \dfrac{2}{n}$

3. $a_n = \dfrac{4}{n(n+1)}$

4. $a_n = \dfrac{1}{2n^2}$

5. $a_n = \dfrac{2}{n^2}$

6. $a_n = \dfrac{1}{2n}$

CalC12g01exam2

55:06, calculus3, multiple choice, > 1 min, wording-variable.

032

Determine which, if any, of the series

A. $\dfrac{3}{5} + \dfrac{4}{6} + \dfrac{5}{7} + \dfrac{6}{8} + \dfrac{7}{9} + \ldots$

B. $\displaystyle\sum_{m=3}^{\infty} \frac{m+2}{(m \ln m)^2}$

are divergent.

1. A only

2. neither of them

3. B only

4. both of them

CalC12g01a

55:06, calculus3, multiple choice, > 1 min, wording-variable.

033

Which, if any, of the following statements are true?

A. If $\sum a_n$ is divergent, then $\sum |a_n|$ is divergent.

B. If $\sum a_n$ converges, then $\lim_{n\to\infty} a_n = 0$.

C. The Ratio Test can be used to determine whether $\sum 1/n!$ converges.

1. B only

2. none of them

3. A only

4. A and B only

5. C only

6. all of them

7. A and C only

8. B and C only

CalC12h10b

55:08, calculus3, multiple choice, > 1 min, wording-variable.

034

Find the interval of convergence of the power series

$$\sum_{n=0}^{\infty} \frac{8^n}{5n^8+3} x^n.$$

1. interval $= \left[-\frac{8}{5}, \frac{8}{5}\right)$

2. interval $= \left[-\frac{1}{8}, \frac{1}{8}\right)$

3. interval $= \left[-\frac{8}{5}, \frac{8}{5}\right]$

4. interval $= [-8, 8]$

5. interval $= [-8, 8)$

6. interval $= \left[-\frac{1}{8}, \frac{1}{8}\right]$

CalC12h30a

55:08, calculus3, multiple choice, > 1 min, wording-variable.

035

If the series

$$\sum_{n=0}^{\infty} c_n x^n$$

converges when $x = -4$ and diverges when $x = 5$, which of the following series converge without further restrictions on $\{c_n\}$?

A. $\sum_{n=0}^{\infty} c_n 8^n$

B. $\sum_{n=0}^{\infty} (-1)^n c_n 9^n$

C. $\sum_{n=0}^{\infty} c_n (-4)^{n+1}$

1. C only

2. A and C only

3. A and B only

4. none of them

5. B only

6. B and C only

7. A only

8. all of them

CalC12i03c

55:09, calculus3, multiple choice, < 1 min, wording-variable.

036

Find a power series representation for the function

$$f(z) = \frac{1}{z-2}.$$

1. $f(z) = \sum_{n=0}^{\infty} (-1)^{n-1} 2^{n+1} z^n$

2. $f(z) = \sum_{n=0}^{\infty} (-1)^n 2^n z^n$

3. $f(z) = -\sum_{n=0}^{\infty} \frac{1}{2^{n+1}} z^n$

4. $f(z) = \sum_{n=0}^{\infty} \frac{1}{2^{n+1}} z^n$

5. $f(z) = -\sum_{n=0}^{\infty} 2^n z^n$

CalC12i22a

55:09, calculus3, multiple choice, > 1 min, wording-variable.

037

Find a power series representation for the function

$$f(z) = \ln \sqrt{\frac{1-2z}{1+2z}}.$$

(*Hint*: remember properties of logs.)

1. $f(z) = -\sum_{n=1}^{\infty} \frac{2^{2n-1}}{2n-1} z^{2n-1}$

2. $f(z) = \sum_{n=1}^{\infty} \frac{(-1)^n 2^{2n-1}}{2n-1} z^{2n-1}$

3. $f(z) = \sum_{n=1}^{\infty} \frac{2^{2n-1}}{2n-1} z^{2n-1}$

4. $f(z) = -\sum_{n=1}^{\infty} \frac{2^{2n}}{2n} z^{2n}$

5. $f(z) = \sum_{n=1}^{\infty} \frac{2^{2n}}{2n} z^{2n}$

CalC12j17a

55:10, calculus3, multiple choice, > 1 min, wording-variable.

038

Find the degree three Taylor polynomial T_3 centered at $x = 0$ for f when

$$f(x) = \frac{1}{(4x+1)^{1/2}}.$$

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2. $T_3(x) = 1 + 2x - 2x^2 - 20x^3$

3. $T_3(x) = 1 + 2x - 6x^2 + 20x^3$

4. $T_3(x) = x + 6x^2 + 20x^3$

5. $T_3(x) = 1 - 2x + 12x^2 - 120x^3$

6. $T_3(x) = 1 - 2x + 6x^2 - 20x^3$

CalC12b49a

55:02, calculus3, multiple choice, > 1 min, wording-variable.

039

Find the n^{th} term, a_n, of an infinite series $\sum_{n=1}^{\infty} a_n$ when the n^{th} partial sum, S_n, of the series is given by

$$S_n = \frac{n}{n+1}.$$

1. $a_n = \frac{1}{n(n+1)}$

2. $a_n = \frac{2}{n}$

3. $a_n = \frac{2}{n^2}$

4. $a_n = \frac{1}{2n}$

5. $a_n = \frac{1}{2n^2}$

6. $a_n = \frac{4}{n(n+1)}$

CalC12h05s

55:08, calculus3, multiple choice, > 1 min, normal.

040

Find the interval of convergence of the series

$$\sum_{n=1}^{\infty} (-1)^n \frac{x^n}{4n^2+5}.$$

1. interval of cgce $= (-4, 5]$

2. interval of cgce $= [-1, 1]$

3. interval of cgce $= [-1, 1)$

4. interval of cgce $= (-1, 1]$

5. interval of cgce $= [-4, 5]$

6. converges only at $x = 0$