Time l

Assume $\sum_{n=1}^{\infty} a_n$ is an infinite series with partial sums given by

$$S_N = 4 + \frac{2}{N-1}.$$

What is a_6?

A) $-\frac{2}{5}$.

B) $\frac{2}{5}$.

C) $-\frac{1}{10}$.

D) $\frac{1}{10}$.

E) None of the above.

C

Which of the following series converge?

I. $\sum_{n=1}^{\infty} \frac{2}{3+\frac{1}{n}}$ II. $\sum_{n=2}^{\infty} \frac{1}{\ln n^5}$ III. $\sum_{n=1}^{\infty} \frac{n}{\sqrt{n^2-1}}$

A) I only.

B) None of them.

C) II only.

D) III only.

E) II and III.

B

Time left 0:45:27

Express the area of the surface obtained by rotating the curve

$y = \frac{1}{2}\ln\csc(2x)$ between $x = \frac{\pi}{6}$ and $x = \frac{\pi}{4}$ about the y −axis as an integral.

A) $\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \csc(2x)\ln\csc(2x)\,dx.$

B) $\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \ln\csc(2x)\sqrt{1+\frac{1}{4}\cot^2(2x)}dx.$

C) $2\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\csc(2x)\,dx.$

D) $2\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\sqrt{1+\frac{1}{4}\cot^2(2x)}dx.$

E) None of the above.

A

○ A)

Find the sum of the series:

$$\sum_{n=1}^{\infty} \frac{3^{n+1} - 2^{n-2}}{4^n}$$

or conclude that it diverges.

A) $\frac{35}{4}$.

B) $\frac{37}{4}$.

C) $\frac{53}{2}$.

D) $\frac{55}{2}$.

E) Diverges.

A

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A solid is formed with a base that is a triangle with vertices at $(0,0)$, $(6,0)$ and $(0,1)$. Cross sections of this solid, perpendicular to the x −axis are squares. Find the volume of the solid.

A) $\frac{1}{2}$.

B) $\frac{1}{3}$.

C) 3.

D) 2.

E) None of the above.

○ A)

Let R be the region in the plane enclosed by $y = x^3$, $y = 0$, and $x = 1$. Find the volume of the solid formed by rotating R about the axis $x = 2$.

A) $V = \pi \int_0^1 \left(\left(2 - y^{\frac{1}{3}}\right)^2 - 1\right) dy.$

B) $V = \pi \int_0^1 \left(1 - \left(2 - y^{\frac{1}{3}}\right)^2\right) dy.$

C) $V = \pi \int_0^1 \left(\left(y^{\frac{1}{3}} + 2\right)^2 - 1\right) dy.$

D) $V = \pi \int_0^1 \left(y^{\frac{2}{3}} - 1\right) dy.$

E) None of the above.

- (selected) A)
- B)
- C)
- D)
- E)

Assume $\sum_{n=1}^{\infty} a_n$ is an infinite series with partial sums given by

$$S_N = 4 + \frac{2}{N-1}.$$

What is a_6?

A) $-\frac{2}{5}$.

B) $\frac{2}{5}$.

C) $-\frac{1}{10}$.

D) $\frac{1}{10}$.

E) None of the above.

- ○ A)
- ○ B)
- ◉ C)
- ○ D)
- ○ E)

Express the area of the surface obtained by rotating the curve

$y = \frac{1}{2}\ln\csc(2x)$ between $x = \frac{\pi}{6}$ and $x = \frac{\pi}{4}$ about the y –axis as an integral.

A) $\pi\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \csc(2x)\ln\csc(2x)\,dx.$

B) $\pi\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \ln\csc(2x)\sqrt{1+\frac{1}{4}\cot^2(2x)}dx.$

C) $2\pi\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\csc(2x)\,dx.$

D) $2\pi\int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\sqrt{1+\frac{1}{4}\cot^2(2x)}dx.$

E) None of the above.

○ A)

○ B)

◉ C)

○ D)

Find the sum of the series:

$$\sum_{n=1}^{\infty} \frac{3^{n+1} - 2^{n-2}}{4^n}$$

or conclude that it diverges.

A) $\frac{35}{4}$.

B) $\frac{37}{4}$.

C) $\frac{53}{2}$.

D) $\frac{55}{2}$.

E) Diverges.

- ◉ A)
- ○ B)
- ○ C)
- ○ D)

Time left 0:45:27

Express the area of the surface obtained by rotating the curve

$y = \frac{1}{2}\ln\csc(2x)$ between $x = \frac{\pi}{6}$ and $x = \frac{\pi}{4}$ about the y-axis as an integral.

A) $\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \csc(2x)\ln\csc(2x)\,dx.$

B) $\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} \ln\csc(2x)\sqrt{1+\frac{1}{4}\cot^2(2x)}\,d$

C) $2\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\csc(2x)\,dx.$

D) $2\pi \int_{\frac{\pi}{6}}^{\frac{\pi}{4}} x\sqrt{1+\frac{1}{4}\cot^2(2x)}\,dx.$

E) None of the above.

C

○ A)

Tim

Express the arc length of the curve $y = \frac{x^4}{8} + \frac{x^{-2}}{4}$ between $x = -3$ and $x = -1$ as an integral.

A) $\int_{-3}^{-1} \left(\frac{x^3}{2} + \frac{1}{2x^3} \right) dx.$

B) $\int_{-1}^{-3} \left(\frac{x^3}{2} + \frac{1}{2x^3} \right) dx.$

C) $\int_{-3}^{-1} \left(\frac{x^3}{2} - \frac{1}{2x^3} \right) dx.$

D) $\int_{-1}^{-3} \left(\frac{x^3}{2} - \frac{1}{2x^3} \right) dx.$

E) None of the above.

Let R be the region in the half plane $x \geq 0$ bounded by the curves

$$y = -5x + 5$$
$$y = x^2 - 1$$
$$x = 0$$

Compute the volume of the solid of revolution formed by rotating R about the vertical line $x = -2$.

A) $V = 2\pi \int_0^1 (x - 2)[(-5x + 5) - (x^2 - 1)]dx.$

B) $V = 2\pi \int_0^1 (x + 2)[(x^2 - 1) - (-5x + 5)]dx.$

C) $V = 2\pi \int_0^1 (x + 2)[(-5x + 5) - (x^2 - 1)]dx.$

D) $V = 2\pi \int_0^1 (x - 2)[(x^2 - 1) - (-5x + 5)]dx.$

E) None of the above.

C

Time

Express the arc length of the curve $y = \frac{x^4}{8} + \frac{x^{-2}}{4}$ between $x = -3$ and $x = -1$ as an integral.

A) $\int_{-3}^{-1} \left(\frac{x^3}{2} + \frac{1}{2x^3}\right) dx.$

B) $\int_{-1}^{-3} \left(\frac{x^3}{2} + \frac{1}{2x^3}\right) dx.$

C) $\int_{-3}^{-1} \left(\frac{x^3}{2} - \frac{1}{2x^3}\right) dx.$

D) $\int_{-1}^{-3} \left(\frac{x^3}{2} - \frac{1}{2x^3}\right) dx.$

E) None of the above.

- (selected) A)
- B)
- C)
- D)
- E)

Let $\sum_{n=1}^{\infty} a_n$ be a series with partial sums S_N. If $a_n = f(n)$, where $f(x)$ Time left 0:19:08 continuous, and decreasing function. Which of the following statements are always true?

I. If $\sum_{n=1}^{\infty} a_n$ converges, then $\lim_{n\to\infty} a_n = 0$.

II. If $\sum_{n=1}^{\infty} a_n = L$, then $\lim_{n\to\infty} a_n = L$.

III. If $\lim_{n\to\infty} a_n = 0$, then $\sum_{n=1}^{\infty} a_n$ converges.

IV. If $\lim_{N\to\infty} S_N = L$, then $\sum_{n=1}^{\infty} a_n = L$.

V. If $\int_1^{\infty} f(x)dx = L$, then $\sum_{n=1}^{\infty} a_n = L$.

A) III and IV.

B) II, III, IV.

C) I and IV.

D) III, IV, V.

E) All of them.

○ A)

◉ B)

○ C)

○ D)

Assume the terms of a sequence $\{a_n\}_{n=1}^{\infty}$ are given by the following formula:

$$a_n = \frac{1}{2n^3} + \frac{2^2}{2n^3} + \frac{3^2}{2n^3} + \cdots + \frac{n^2}{2n^3}.$$

Find the limit of the sequence or conclude that it diverges.

<u>Hint</u>: $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$.

A) $\frac{2}{6}$.

B) $\frac{1}{6}$.

C) $\frac{2}{3}$.

D) 0.

E) Diverges.

- ○ A)
- ○ B)
- ○ C)
- ◉ D)

Let R be the region in the half plane $x \geq 0$ bounded by the curves

$$y = -5x + 5$$
$$y = x^2 - 1$$
$$x = 0$$

Compute the volume of the solid of revolution formed by rotating R about the vertical line $x = -2$.

A) $V = 2\pi \int_0^1 (x-2)\left[(-5x+5) - (x^2-1)\right]dx.$

B) $V = 2\pi \int_0^1 (x+2)\left[(x^2-1) - (-5x+5)\right]dx.$

C) $V = 2\pi \int_0^1 (x+2)\left[(-5x+5) - (x^2-1)\right]dx.$

D) $V = 2\pi \int_0^1 (x-2)\left[(x^2-1) - (-5x+5)\right]dx.$

E) None of the above.

- ○ A)
- ○ B)
- ◉ C)
- ○ D)

A solid is formed with a base that is a triangle with vertices at $(0,0)$, $(3,0)$ and $(0,1)$. Cross sections of this solid, perpendicular to the x −axis are squares. Find the volume of the solid.

A) $\frac{1}{2}$.

B) $\frac{1}{3}$.

C) 1.

D) $\frac{3}{2}$.

E) None of the above.

- ○ A)
- ○ B)
- ◉ C)
- ○ D)
- ○ E)

Which of the following series converge?

I. $\sum_{n=1}^{\infty} 2n^{\frac{-1}{3}}$ II. $\sum_{n=2}^{\infty} \frac{n}{e^n}$ III. $\sum_{n=1}^{\infty} \frac{\sin(2n^3)}{2^n+n}$

A) I only.
B) II only.
C) III only.
D) II and III.
E) None of them.

- ○ A)
- ○ B)
- ○ C)
- ◉ D)
- ○ E)

Clear my choice

Find the sum of the series:

$$\sum_{n=4}^{\infty} \frac{6}{(n-2)(n+1)}$$

or conclude that it diverges.

A) $\frac{11}{3}$.

B) $\frac{13}{3}$.

C) $\frac{13}{6}$.

D) 0.

E) Diverges.

- ○ A)
- ○ B)
- ◉ C)
- ○ D)
- ○ E)

Which of the following series converge?

I. $\sum_{n=1}^{\infty} \frac{2}{3+\frac{1}{n}}$ II. $\sum_{n=2}^{\infty} \frac{1}{\ln n^5}$ III. $\sum_{n=1}^{\infty} \frac{n}{\sqrt{n^2-1}}$

A) I only.

B) None of them.

C) II only.

D) III only.

E) II and III.

- ○ A)
- ○ B)
- ○ C)
- ◉ D)
- ○ E)

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A solid is formed with a base that is a triangle with vertices at $(0, 0)$, $(3, 0)$ and $(0, 1)$. Cross sections of this solid, perpendicular to the x –axis are squares. Find the volume of the solid.

A) $\frac{1}{2}$.

B) $\frac{1}{3}$.

C) 1.

D) $\frac{3}{2}$.

E) None of the above.

○ A)

○ B)

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V. If $\int_1^{\infty} f(x)dx = L$, then $\sum_{n=1}^{\infty} a_n = L$.

A) III and IV.

B) II, III, IV.

C) I and IV.

D) III, IV, V.

E) All of them

C

Which of the following series converge?

I. $\sum_{n=1}^{\infty} 2n^{\frac{-1}{3}}$ II. $\sum_{n=2}^{\infty} \frac{n}{e^{n}}$ III. $\sum_{n=1}^{\infty} \frac{\sin(2n^{3})}{2^{n}+n}$

A) I only.

B) II only.

C) III only.

D) II and III.

E) None of them.

D

Find the sum of the series:

$$\sum_{n=4}^{\infty} \frac{6}{(n-2)(n+1)}$$

or conclude that it diverges.

A) $\frac{11}{3}$.

B) $\frac{13}{3}$.

C) $\frac{13}{6}$.

D) 0.

A

Time l

Assume the terms of a sequence $\{a_n\}_{n=1}^{\infty}$ are given by the following formula:

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Find the limit of the sequence or conclude that it diverges.

<u>Hint</u>: $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$.

A) $\frac{2}{6}$.

B) $\frac{1}{6}$.

C) $\frac{2}{3}$.

D) 0.

E) Diverges.

B