Question 1
Not yet answered
Marked out of 3.00
Flag question

If $\Sigma_{n=0}^{\infty} a_n$, and $\Sigma_{n=0}^{\infty} b_n$ are two series with positive terms and $a_n \leq b_n$, then one of the following is true

A) If $\Sigma_{n=0}^{\infty} a_n$ diverge, and $lim_{n\to\infty} \frac{a_n}{b_n} = 2$ then $\Sigma_{n=0}^{\infty} b_n$ converge

B) If $\Sigma_{n=0}^{\infty} a_n$ converge, then $\Sigma_{n=0}^{\infty} b_n$ converge

C) If $\Sigma_{n=0}^{\infty} a_n$ converge, and $lim_{n\to\infty} \frac{a_n}{b_n} = 3$ then $\Sigma_{n=0}^{\infty} b_n$ diverge

D) If $\Sigma_{n=0}^{\infty} a_n$ diverge, and $lim_{n\to\infty} \frac{a_n}{b_n} = \frac{1}{4}$ then $\Sigma_{n=0}^{\infty} b_n$ diverge

E) If $\Sigma_{n=0}^{\infty} b_n$ diverge, then $\Sigma_{n=0}^{\infty} a_n$ diverge

Select one:

- A
- B
- C
- D
- E

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Finish attempt ...

Time left 0:59:46

From LCT: Assume a_n is a divergent series and $a_n \leq b_n$

If $\lim_{n\to\infty} \frac{b_n}{a_n} = L$ $(0 \leq L < \infty) \Longrightarrow b_n$ is divergent

$\boxed{\text{Answer is D}}$

Question 2

Not yet answered

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Flag question

The interval of convergence of the series $\sum_{n=0}^{\infty} \frac{5^{2n+5} x^{n+1}}{2^{3n+1}}$ is

A) $\left[\frac{-8}{25}, \frac{8}{25}\right]$

B) $\left(\frac{-2}{5}, \frac{2}{5}\right)$

C) $\left[\frac{-2}{5}, \frac{2}{5}\right]$

D) $(-\infty, \infty)$

E) $\left(\frac{-8}{25}, \frac{8}{25}\right)$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:59:20

$$\sum_{n=0}^{\infty} \frac{5^{2n+5}x^{n+1}}{2^{n+1}} = \sum_{n=0}^{\infty} \frac{5^{2n} * 5^5 * x^{n+1}}{2^{3n} * 2^1} = \frac{5^5}{2} \sum_{n=0}^{\infty} \frac{25^n x^{n+1}}{8^n}$$

Using ratio test: $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| = \lim_{n\to\infty} \left| \frac{25^{n+1}x^{n+2}}{8^{n+1}} * \frac{8^n}{25^n x^{n+1}} \right| = \left| \frac{25x}{8} \right|$

For the series to converge: $\left| \frac{25x}{8} \right| < 1 \longrightarrow \frac{-8}{25} < x < \frac{8}{25}$

Check endpoints: $x = \frac{-8}{25} \longrightarrow \frac{5^5}{2} \sum_{n=0}^{\infty} \frac{25^n (\frac{-8}{25})^{n+1}}{8^n}$, the series diverges

$x = \frac{8}{25} \longrightarrow \frac{5^5}{2} \sum_{n=0}^{\infty} \frac{25^n (\frac{8}{25})^{n+1}}{8^n}$, the series diverges

Answer is E

Question 3

Not yet answered

Marked out of 3.00

Flag question

The sum of the series $\Sigma_{k=2}^{\infty} \frac{1-2^{k-1}}{3^{k-1}}$ is:

A) $\frac{-3}{2}$

B) $\frac{13}{2}$

C) $\frac{5}{2}$

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

E) $\frac{-8}{2}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left **0:58:59**

$$\sum_{n=2}^{\infty} \frac{1-2^{k-1}}{3^{k-1}} = \sum_{n=2}^{\infty} \frac{1}{3^{k-1}} - \sum_{n=2}^{\infty} \frac{2^{k-1}}{3^{k-1}} = 3 * \frac{1/9}{1-1/3} - \frac{3}{2} * \frac{4/9}{1-2/3} = \frac{-3}{2}$$

$\boxed{\text{Answer is A}}$

Question 4

Not yet answered

Marked out of 3.00

Flag question

The curve $r = 6sin\theta - 4cos\theta$ represents

A) Circle with center $(-2, 3)$ and radius $\sqrt{13}$

B) Circle with center $(-2, -3)$ and radius $\sqrt{13}$

C) Circle with center $(3, -2)$ and radius $\sqrt{13}$

D) Circle with center $(2, -3)$ and radius $\sqrt{13}$

E) Circle with center $(-2, 3)$ and radius $\sqrt{5}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left **0:58:37**

$r^2 = 6r\sin\theta - 4r\cos\theta$

$x^2 + y^2 = 6y - 4x$

$x^2 + 4x + y^2 - 6y = 0$

$x^2 + 4x + 4 + y^2 - 6y + 9 = 13$

$(x+2)^2 + (y-3)^2 = 13$

center is $(-2, 3)$ and radius is $\sqrt{13}$

OR: $r = 2a\cos\theta + 2b\sin\theta \rightarrow$ center is (a, b) and radius is $\sqrt{a^2 + b^2}$

$\boxed{\text{Answer is A}}$

Question **5**

Not yet answered

Marked out of 4.00

Flag question

If $cos x = \Sigma_{k=0}^{\infty} \frac{(-1)^k x^{2k}}{(2k)!}$, **then** $\Sigma_{k=1}^{\infty} \frac{(-1)^{k+1} \pi^{2k}}{3^{2k-1}(2k)!} =$

A) $\frac{-3\pi}{2}$

B) $\frac{3\pi}{2}$

C) $\frac{\pi}{2}$

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

E) $\frac{-3}{2}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:58:19

$$\sum_{k=1}^{\infty} \frac{(-1)^{k+1}\pi^{2k}}{3^{2k-1}(2k)!} = -3\sum_{k=1}^{\infty} \frac{(-1)^k \left(\frac{\pi}{3}\right)^{2k}}{(2k)!} = -3\left(\sum_{k=0}^{\infty} \frac{(-1)^k \left(\frac{\pi}{3}\right)^{2k}}{(2k)!} - 1\right)$$

$$= -3(\cos\frac{\pi}{3} - 1) = \frac{3}{2}$$

Answer is D

Question **6**

Not yet answered

Marked out of 4.00

Flag question

If $f(x) = \Sigma_{k=0}^{\infty} \frac{(-1)^k x^{4k}}{4^k k!}$, $g(x) = x f'(4x)$, then the series representation of $g(x)$ is

A) $\Sigma_{k=1}^{\infty} \frac{(-1)^k \, k \, 4^k \, x^{4k}}{k!}$

B) $\Sigma_{k=1}^{\infty} \frac{(-1)^k \, 4^{3k} \, x^{4k+1}}{k!}$

C) $\Sigma_{k=1}^{\infty} \frac{(-1)^k \, k \, 4^{3k} \, x^{4k}}{k!}$

D) $\Sigma_{k=1}^{\infty} \frac{(-1)^k \, k \, 4^{-k} \, x^{4k}}{k!}$

E) $\Sigma_{k=1}^{\infty} \frac{(-1)^k \, 4^{3k} \, x^{4k}}{k!}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:57:45

$$f'(x) = \sum_{k=0}^{\infty} \frac{(-1)^k (4k)(x)^{4k-1}}{4^k k!}$$

$$f'(4x) = \sum_{k=1}^{\infty} \frac{(-1)^k (4k)(4x)^{4k-1}}{4^k k!}$$

$$g(x) = xf'(4x) = \sum_{k=1}^{\infty} \frac{(-1)^k k \, 4^{4k} \, x^{4k}}{4^k k!} \to g(x) = \sum_{k=1}^{\infty} \frac{(-1)^k k \, 4^{3k} \, x^{4k}}{k!}$$

$\boxed{\text{Answer is C}}$

Question 7

Not yet answered

Marked out of 3.00

Flag question

The power series representation of $f(x) = \frac{x}{x-5}$ is

A) $-\Sigma_{k=0}^{\infty} \frac{x^k}{5^{k+1}}, \quad |x| < 5$

B) $\Sigma_{k=0}^{\infty} \frac{x^{k+1}}{5^{k+1}}, \quad |x| < 5$

C) $-\Sigma_{k=0}^{\infty} \frac{x^{k+3}}{5^k}, \quad |x| < 5$

D) $-\Sigma_{k=0}^{\infty} \frac{x^{k+1}}{5^{k+1}}, \quad |x| < 5$

E) $\Sigma_{k=0}^{\infty} (-1)^k \frac{x^{k+1}}{5^{k+1}}, \quad |x| < 5$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:57:23

$$\frac{1}{1-x} = \sum_{k=0}^{\infty} x^k$$

$$\frac{1}{\frac{x}{5}-1} = -\sum_{k=0}^{\infty} \left(\frac{x}{5}\right)^k = \frac{5}{x-5}$$

$$f(x) = \frac{x}{x-5} = -\sum_{k=0}^{\infty} \frac{x^{k+1}}{5^{k+1}}$$

$$\boxed{\text{Answer is D}}$$

Question 8

Not yet answered

Marked out of 4.00

Flag question

Which of the following series is conditionally converge:

A) $\Sigma_{n=1}^{\infty}(-1)^n\frac{2n+1}{3n^3+3n+1}$

B) $\Sigma_{n=1}^{\infty}(-1)^n\frac{2}{3^n-1}$

C) $\Sigma_{n=1}^{\infty}(-1)^n\frac{1}{n^2+3n+1}$

D) $\Sigma_{n=1}^{\infty}(-1)^n\frac{5}{4^n+1}$

E) $\Sigma_{n=1}^{\infty}(-1)^n\frac{n^2-3}{n^3+5n+2}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:57:04

For series (A), using LCT with $\boxed{b_n = \frac{1}{n^2}}$ it's absolutely convergent

For series (B), using LCT with $\boxed{b_n = \frac{1}{3^n}}$ it's absolutely convergent

For series (C), using LCT with $\boxed{b_n = \frac{1}{n^2}}$ it's absolutely convergent

For series (D), using LCT with $\boxed{b_n = \frac{1}{4^n}}$ it's absolutely convergent

For series (E), using alternating test:

1) Prove that a_n is decreasing, you can use the first derivative

2) $\lim_{n\to\infty} |a_n| = \lim_{n\to\infty} \frac{n^2-3}{n^3+5n+2} = 0$

Since both conditions are true, the series is conditionally convergent

$\boxed{\text{Answer is E}}$

The appropriate trigonometric substitution that solves the integral $\int \sqrt{x^2 + 6x + 5}\, dx$ is:

A) $x = 3 + 2\sin\theta$
B) $x = 3 + 2\sec\theta$
C) $x = 3 + 2\tan\theta$
D) $x = -3 + 2\sec\theta$
E) $x = -3 + 2\sin\theta$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left **0:56:42**

$\sqrt{x^2+6x+5} = \sqrt{(x+3)^2-4}$

الجواب يجب أن يتخلص من الجذر

$\sqrt{(-3+2\sec\theta+3)^2-4} = \sqrt{4\sec^2\theta-4} = 2\tan\theta$

Answer is D

Question 10

Not yet answered

Marked out of 3.00

Flag question

$$\int (2x-4)e^{2x-4}dx =$$

A) $\frac{1}{2}e^{2x-4}(2x-3)+C$

B) $\frac{1}{2}e^{2x-4}(2x-5)+C$

C) $\frac{1}{2}e^{2x-4}(2x+5)+C$

D) $\frac{1}{2}e^{2x+4}(2x-3)+C$

E) $\frac{1}{2}e^{2x+4}(2x-5)+C$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:56:24

Using integration by parts:

$u = 2x - 4 \quad dv = e^{2x-4}$

$du = 2dx \qquad v = \frac{1}{2}e^{2x+4}$

$\int udv = uv - \int duv$

$$\int (2x-4)e^{2x-4}\,dx = \frac{1}{2}(2x-4)e^{2x-4} - \int e^{2x-4}\,dx = \frac{1}{2}(2x-5)e^{2x-4}$$

$\boxed{\text{Answer is B}}$

Question 11

Not yet answered

Marked out of 3.00

Flag question

Which of the following series is converge:

A) $\Sigma_{n=1}^{\infty}(\frac{5n^2+n+1}{4n^2+n+6})^n$

B) $\Sigma_{n=1}^{\infty}(\frac{n-5}{n})^n$

C) $\Sigma_{n=1}^{\infty}(\frac{3n^3+n+1}{n^3+n+6})^n$

D) $\Sigma_{n=1}^{\infty}(\frac{n+3}{n})^n$

E) $\Sigma_{n=1}^{\infty}(\frac{5n^3+n^2+4}{7n^3+n+1})^n$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:51:53

Series A and C are divergent by root test

Series B: $\lim_{n\to\infty} a_n = \lim_{n\to\infty} \left(1 - \frac{5}{n}\right)^n = e^{-5} \neq 0 \longrightarrow$ divergent by divergence test

Series D: $\lim_{n\to\infty} a_n = \lim_{n\to\infty} \left(1 + \frac{3}{n}\right)^n = e^{3} \neq 0 \longrightarrow$ divergent by divergence test

Series E: $\lim_{n\to\infty} \sqrt[n]{|a_n|} = \lim_{n\to\infty} \frac{5n^3 + n^2 + 4}{7n^3 + n + 1} = \frac{5}{7} < 1 \longrightarrow$convergent

$\boxed{\text{Answer is E}}$

Question 12

Not yet answered

Marked out of 3.00

Flag question

Consider the series $\sum_{n=0}^{\infty} a_n$ where $a_n = \frac{(-6)^n}{n\,(7)^{n+1}}$

Then $\lim_{n\to\infty} \left|\frac{a_{n+1}}{a_n}\right|$

A) ∞

B) 0

C) $\frac{-6}{7}$

D) $\frac{7}{6}$

E) $\frac{6}{7}$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

1 2 3 4 5 6 7 8 9 10
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Finish attempt ...

Time left 0:51:37

$$\lim_{n\to\infty}\left|\frac{a_{n+1}}{a_n}\right| = \lim_{n\to\infty}\frac{6^{n+1}}{(n+1)7^{n+2}} * \frac{(n)7^{n+1}}{6^n} = \lim_{n\to\infty}\frac{6}{7} * \frac{n}{n+1} = \frac{6}{7}$$

$\boxed{\text{Answer is E}}$

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Question 13
Not yet answered
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The integral that represents the volume of the solid obtained by rotating the region enclosed by $y = 2x$, $y = x + 2$, and $y = 0$ about x-axis is

A) $\int_{-2}^{0}(x+2)^2dx \; + \; \int_{0}^{2}(4x^2)dx$

B) $\int_{-2}^{0}(x+2)^2dx \; + \; \int_{0}^{2}(-3x^2+4x+4)dx$

C) $\int_{-2}^{2}(x+2)^2dx \; - \; \int_{-2}^{2}4x^2dx$

D) $\int_{0}^{2}(\frac{y}{2}+2)dy$

E) $\int_{-2}^{2}(x+2)^2dx \; + \; \int_{0}^{2}(2-x)^2dx$

Select one:

Quiz navigation

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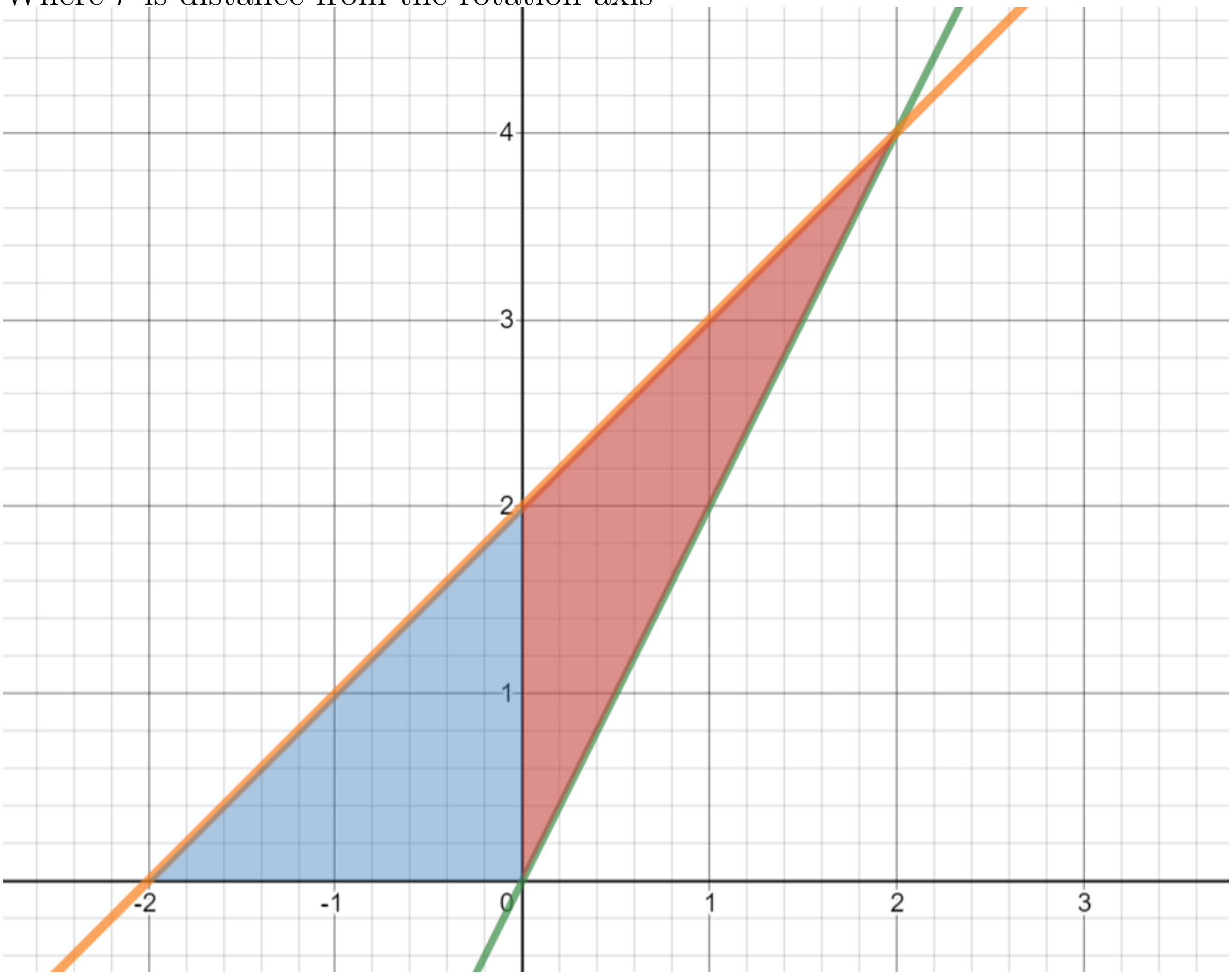
Finish attempt ...

Time left 0:49:47

Volume using disk method: $\pi \int_{x_1}^{x_2} [(r_2)^2 - (r_1)^2] dx$

Where r is distance from the rotation axis



Blue part:

$$V_1 = \pi \int_{-2}^{0} (x+2)^2 dx$$

Red part:

$$V_2 = \pi \int_{0}^{2} [(x+2)^2 - (2x)^2] dx = \pi \int_{0}^{2} (-12x^2 + 8x + 4) dx$$

$$V = V_1 + V_2 = \pi \int_{-2}^{0} (x+2)^2 dx + \pi \int_{0}^{2} (-3x^2 + 2x + 4) dx$$

المطلوب في السؤال التكامل فقط، لهذا السبب π غير موجود في الاجابات

Answer is B

Question 14

Not yet answered

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Flag question

The polar coordinate of the point $(-\sqrt{3}, -\sqrt{3})$ is

A) $(\sqrt{6}, \frac{\pi}{4})$

B) $(6, \frac{5\pi}{4})$

C) $(\sqrt{6}, \frac{-\pi}{4})$

D) $(\sqrt{6}, \frac{3\pi}{4})$

E) $(\sqrt{6}, \frac{5\pi}{4})$

Select one:

- A
- B
- C
- D
- E

Quiz navigation

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Finish attempt ...

Time left 0:49:01

$r = \sqrt{(-\sqrt{3})^2 + (-\sqrt{3})^2} = \sqrt{6}$

$\theta = \arctan\left(\frac{-\sqrt{3}}{-\sqrt{3}}\right) = \frac{\pi}{4}$, but since our angle was in the third quadrant $\theta = \pi - \frac{\pi}{4} = \frac{3\pi}{4}$

$\boxed{\text{Answer is D}}$

Question 15

Not yet answered

Marked out of 3.00

Flag question

(By cylindrical shells) The integral that represents the volume of the solid obtained by rotating the region bounded by $y = \sqrt{x}$, $y = 1$ and $x = 0$ about $y = 1$ is:

A) $2\pi \int_0^1 (1-y)y^2 \, dy$

B) $2\pi \int_0^1 (1-y)y \, dy$

C) $2\pi \int_0^1 (1+y)y^2 \, dy$

D) $2\pi \int_0^1 (y-1)y^2 \, dy$

E) $2\pi \int_0^1 y^3 \, dy$

Select one:

- A
- B

Quiz navigation

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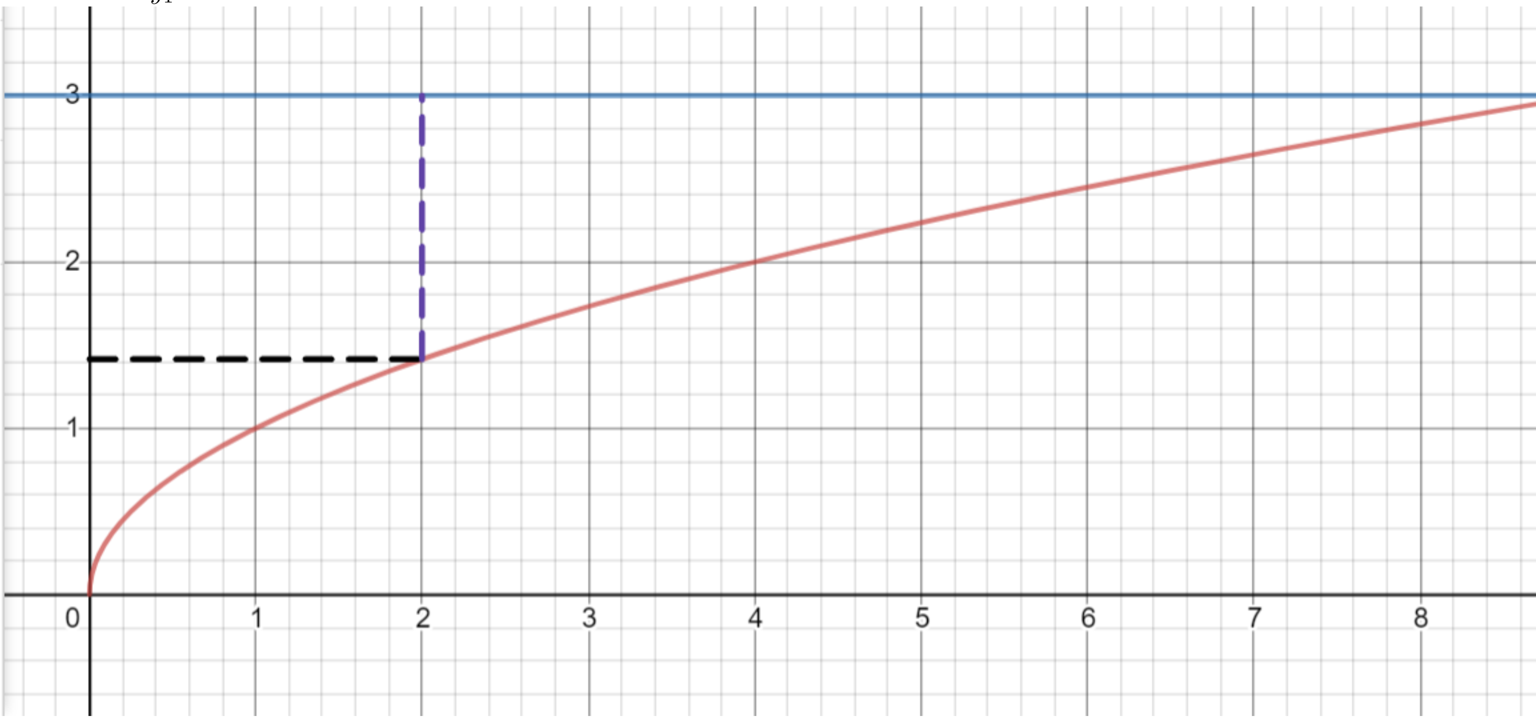
Finish attempt ...

Time left 0:48:47

Cylindrical shells formula:

$$V = 2\pi \int_{y_1}^{y_2} rhdy$$



$r = 1 - y$ (The purple line, which is the distance from the axis of rotation)

$h = y^2$ (The black line, which is the distance from the y-axis)

$$V = 2\pi \int_0^1 y^2(1-y)dy$$

Answer is A