

Question: Compute $\int \frac{x^2}{1-x^2} dx$.

Answer:

$$-x + \frac{1}{2} \ln |1-x| + \frac{1}{2} \ln |1+x| + C$$

□

Question: Compute $\int_0^\infty x e^{-x} dx$.

Answer:

$$1$$

□

Question: Compute $\int \frac{1}{x(1+(\ln(x))^2)} dx$.

Answer:

$$\tan^{-1}(\ln(x)) + C$$

□

Question: Find the length of the curve: $y = \ln(\cos(\theta)), 0 \leq \theta \leq \pi/4$.

Answer:

$$\ln(\sqrt{2} + 1)$$

□

Question: Determine whether the sequence $a_n = \ln(2 - \frac{1}{n})$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, limit} = (\ln(2))^-$$

□

Question: Determine whether the sequence $a_n = \frac{n^3}{n^2+1}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Diverges}$$

□

Question: Determine whether the sequence $a_n = \frac{\cos(n)}{3^n}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, limit} = 0$$

□

Question: Determine whether the series $\sum_{n=1}^\infty \frac{2}{n(n+2)}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, limit} = \frac{3}{2}$$

□

Question: Determine whether the series $\sum_{n=1}^{\infty} \frac{n^2}{1-2n^2}$ converges or diverges. If it converges, find its limit.

Answer:

Diverges

□

Question: Determine whether the series $\sum_{n=1}^{\infty} \frac{1}{2^n}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, sum} = 1$$

□

Question: Determine whether the sequence $a_n = \frac{3^{n-1}}{4^n}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, limit} = 0$$

□

Question: Determine whether the sequence $a_n = \frac{(-1)^n}{n!}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, limit} = 0$$

□

Question: Compute $\int \frac{x^2}{\sqrt{1-x^2}} dx$ converges or diverges. If it converges, find its limit.

Answer:

$$\frac{1}{2}[\sin^{-1}(x) - x\sqrt{1-x^2}] + C$$

□

Question: Determine whether the series $\sum_{n=0}^{\infty} \frac{2^n+1}{3^n}$ converges or diverges. If it converges, find its limit.

Answer:

$$\text{Converges, sum} = \frac{9}{2}$$

□

Question: Determine whether the series $\sum_{n=1}^{\infty} \left(\frac{7}{4}\right)^n$ converges or diverges. If it converges, find its limit.

Answer:

Diverges

□

Question: Determine whether the series $\sum_{n=1}^{\infty} \frac{1}{n^2+n}$ converges or diverges. If it converges, find its limit.

Answer:

Converges, sum = 1

□

Question: Compute $\int \frac{x^2+7x-16}{x^2+6x-7} dx$.

Answer:

$$x + 2 \ln |x + 7| - \ln |x - 1| + C$$

□

Question: Compute $\int \frac{1}{x^2+4x+5} dx$.

Answer:

$$\tan^{-1}(x + 2) + C$$

□

Question: Find the exact area of the surface obtained by rotating the curve: $y = \frac{3}{2}x^2, 1 \leq x \leq 2$ around the y -axis.

Answer:

$$\frac{2\pi}{27} [37^{3/2} - 10^{3/2}]$$

□