Definition of the Definite Integral Practice

1.

Which of the limits is equivalent to the following definite integral?

$$\int_0^{\pi} \sin x \, dx$$

Choose 1 answer:

(A) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \sin\left(\frac{\pi i}{n}\right) \cdot \frac{i}{n}$

(B) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \sin\left(\frac{\pi i}{n}\right) \cdot \frac{\pi}{n}$

(C) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \sin\left(\frac{i}{n}\right) \cdot \frac{i}{n}$

(D) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \sin\left(\frac{i}{n}\right) \cdot \frac{\pi}{n}$

2.

Which of the definite integrals is equivalent to the following limit?

$$\lim_{n\to\infty} \sum_{i=1}^{n} \sqrt{4 + \frac{5i}{n}} \cdot \frac{5}{n}$$

Choose 1 answer:

(A) $\displaystyle\int_4^9 \sqrt{x} \, dx$

(B) $\displaystyle\int_0^4 \sqrt{4 + x} \, dx$

(C) $\displaystyle\int_4^9 \sqrt{4 + x} \, dx$

(D) $\displaystyle\int_0^5 \sqrt{x} \, dx$

3.

Which of the limits is equivalent to the following definite integral?

$$\int_0^5 (x + 1) \, dx$$

Choose 1 answer:

(A) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \left(\frac{5i+1}{n} + 1\right) \cdot \frac{5}{n}$

(B) $\displaystyle\lim_{n\to\infty} \sum_{i=0}^{n} \left(\frac{5i-1}{n} + 1\right) \cdot \frac{5}{n}$

(C) $\displaystyle\lim_{n\to\infty} \sum_{i=1}^{n} \left(\frac{5i}{n} + 1\right) \cdot \frac{5}{n}$

(D) $\displaystyle\lim_{n\to\infty} \sum_{i=0}^{n} \left(\frac{5i+1}{n}\right) \cdot \frac{5}{n}$

4.

Which of the definite integrals is equivalent to the following limit?

$$\lim_{n\to\infty} \sum_{i=1}^{n} 4 \cdot \frac{5}{n}$$

Choose 1 answer:

(A) $\displaystyle\int_0^5 4 \, dx$

(B) $\displaystyle\int_0^4 5x \, dx$

(C) $\displaystyle\int_0^5 4x \, dx$

(D) $\displaystyle\int_0^4 5 \, dx$

5.

Which of the limits is equivalent to the following definite integral?

$$\int_1^e \ln x \, dx$$

Choose 1 answer:

(A) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \ln\left(i \cdot \frac{e-1}{n}\right) \cdot \frac{e-1}{n}$

(B) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \ln\left(1 + i \cdot \frac{e-1}{n}\right) \cdot \frac{e-1}{n}$

(C) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \ln\left(1 + \frac{ei}{n}\right) \cdot \frac{e}{n}$

(D) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \ln\left(1 + \frac{i}{n}\right) \cdot \frac{e}{n}$

6.

Which of the definite integrals is equivalent to the following limit?

$$\lim_{n\to\infty} \sum_{i=1}^{n} \ln\left(2 + \frac{5i}{n}\right) \cdot \frac{5}{n}$$

Choose 1 answer:

(A) $\displaystyle \int_0^7 \ln x \, dx$

(B) $\displaystyle \int_2^5 \ln x \, dx$

(C) $\displaystyle \int_2^7 \ln x \, dx$

(D) $\displaystyle \int_0^5 \ln x \, dx$

7.

Which of the limits is equivalent to the following definite integral?

$$\int_0^\pi \cos x \, dx$$

Choose 1 answer:

(A) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{\pi i}{n}\right) \cdot \frac{\pi}{n}$

(B) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{i}{n}\right) \cdot \frac{\pi}{n}$

(C) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{i}{n}\right) \cdot \frac{i}{n}$

(D) $\displaystyle \lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{\pi i}{n}\right) \cdot \frac{i}{n}$

8 (a)

Which of the definite integrals is equivalent to the following limit?

$$\lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{\pi}{2} + \frac{\pi i}{2n}\right) \cdot \frac{\pi}{2n}$$

Choose 1 answer:

(A) $\int_0^{\pi} \cos x \, dx$

(B) $\int_{\pi/2}^{\pi} \cos x \, dx$

(C) $\int_{\pi/2}^{3\pi/4} \cos x \, dx$

(D) $\int_0^{\pi/2} \cos x \, dx$

(b) Determine the value of

$$\lim_{n\to\infty} \sum_{i=1}^{n} \cos\left(\frac{\pi}{2} + \frac{\pi i}{2n}\right) \cdot \frac{\pi}{2n}$$

9.

Which of the limits is equivalent to the following definite integral?

$$\int_0^3 e^x \, dx$$

Choose 1 answer:

(A) $\lim_{n\to\infty} \sum_{i=1}^{n} e^{2i/n} \cdot \frac{3}{n}$

(B) $\lim_{n\to\infty} \sum_{i=1}^{n} e^{i/n} \cdot \frac{1}{n}$

(C) $\lim_{n\to\infty} \sum_{i=1}^{n} e^{3i/n} \cdot \frac{3}{n}$

(D) $\lim_{n\to\infty} \sum_{i=1}^{n} e^{2i/n} \cdot \frac{2}{n}$

Answers:

1. B   2. A   3. C   4. A   5. B   6. C   7. A

8 (a) B   (b) - 1   9. C