6.3 Summation Notation

Calculus Name: ______________________________ **CA #1**

Write a definite integral that is equivalent to the given summation notation. The lower limit for the integral is also given to help you get started.

1. Integral's lower limit $= 0$

$$\lim_{n\to\infty}\sum_{k=1}^{n}\left(\frac{\pi}{4n}\right)\tan\left(\frac{\pi}{4n}k\right)$$

2. Integral's lower limit $= -1$

$$\lim_{n\to\infty}\sum_{k=1}^{n}\left(\frac{8}{n}\right)\left[4\left(-1+\frac{8k}{n}\right)\right]$$

Write a summation notation equivalent to the definite integral.

3. $\int_{-1}^{3} x^2\,dx$

4. $\int_{3}^{4} \ln x\,dx$

5. Which of the following expressions is equal to $\lim\limits_{n\to\infty}\frac{4}{n}\left(\left(1+\frac{4}{n}\right)^3+\left(1+\frac{8}{n}\right)^3+\left(1+\frac{12}{n}\right)^3+\cdots+\left(1+\frac{4n}{n}\right)^3\right)$?

(A) $\int_1^5 1+x^3\,dx$ (B) $\int_0^4 (1+x)^3\,dx$

(C) $\int_0^4 1+x^3\,dx$ (D) $\int_1^5 (1+x)^3\,dx$

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6. The expression $\frac{2}{9}\left[\left(\frac{1}{3+\frac{2}{9}+1}\right)+\left(\frac{1}{3+\frac{4}{9}+1}\right)+\left(\frac{1}{3+\frac{6}{9}+1}\right)+\cdots+\left(\frac{1}{3+\frac{18}{9}+1}\right)\right]$ is a Riemann sum approximation of which of the following integrals?

(A) $\int_0^2 \frac{1}{x+1}\,dx$ (B) $\int_3^5 \frac{1}{x+1}\,dx$

(C) $\frac{1}{9}\int_0^2\left(\frac{1}{3+x}\right)dx$ (D) $\int_0^2 \frac{1}{3+x}\,dx$ (E) $\frac{1}{9}\int_3^5 \frac{1}{2x+1}\,dx$

1. $\int_0^{\frac{\pi}{4}} \tan(x)\,dx$	2. $\int_{-1}^{7} 4x\,dx$	3. $\lim\limits_{n\to\infty}\sum_{k=1}^{n}\left(\frac{4}{n}\right)\left(-1+\frac{4k}{n}\right)^2$
4. $\lim\limits_{n\to\infty}\sum_{k=1}^{n}\left(\frac{1}{n}\right)\ln\left(3+\frac{k}{n}\right)$	5. $\int_0^4 (1+x)^3\,dx$	6. $\int_3^5 \frac{1}{x+1}\,dx$

Answers to 6.3 CA #1