

(1) Determine a region whose area is equal to the given limit. Do not evaluate the limit.

$$(i) \lim_{n \rightarrow \infty} \frac{1}{n} \sum_{i=1}^n \left(\frac{i}{n}\right)^4$$

$$(iii) \lim_{n \rightarrow \infty} \frac{3}{n} \sum_{i=1}^n \left(2 + \frac{3i}{n}\right)^4$$

$$(ii) \lim_{n \rightarrow \infty} \frac{5}{n} \sum_{i=0}^{n-1} \left(-2 + 5\frac{i}{n}\right)^4$$

$$(iv) \lim_{n \rightarrow \infty} \frac{\pi}{2n} \sum_{i=1}^n \sin\left(\frac{\pi}{3} - \frac{\pi}{4n} + \frac{i\pi}{2n}\right)$$

(2) Find an expression for the area under the graph of  $f$  as a limit. Do not evaluate the limit.

$$f(x) = \cos x, \quad \frac{\pi}{8} \leq x \leq \frac{\pi}{4}$$