

SUM TO INTEGRAL WORKSHEET

Convert each limit of a sum to a definite integral, and evaluate.

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

$$2. \lim_{n \rightarrow \infty} \frac{1}{n} \sum_{k=1}^n \frac{1}{1 + \frac{k}{n}}$$

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

$$4. \lim_{n \rightarrow \infty} \frac{\pi}{2n} \sum_{k=1}^n \sin\left(\frac{k\pi}{2n}\right)$$

$$5. \lim_{n \rightarrow \infty} \sum_{k=1}^n \left(1 + \frac{3k}{n}\right)^3 \frac{3}{n}$$

$$6. \lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n} \left(\left(\frac{k}{n}\right)^3 + 1\right)$$

$$7. \lim_{n \rightarrow \infty} \frac{3}{n} \sum_{k=1}^n \left(\left(2 + \frac{3k}{n}\right)^2 - 2\left(2 + \frac{3k}{n}\right)\right)$$

$$8. \lim_{n \rightarrow \infty} \sum_{i=1}^n \left(\left(\frac{2i}{n}\right)^3 + 5\left(\frac{2i}{n}\right)\right) \frac{1}{n}$$

$$9. \lim_{n \rightarrow \infty} \frac{2}{n} \sum_{k=0}^{n-1} 2^{1 + \frac{2k}{n}}$$

$$10. \lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n} \sin\left(\frac{\pi k}{n}\right)$$

$$11. \lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n+k}$$

$$12. \lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{\sqrt{n}} \left(\frac{1}{\sqrt{n+k}}\right)$$