$$\lim_{n\to\infty} \frac{1}{n} \sum_{k=1}^{n} \sin\frac{kt}{n}$$ ✓

$$\Rightarrow \int_0^1 \sin tx\, dx \Rightarrow -\left[\frac{\cos tx}{t}\right]_0^1$$

$$\Rightarrow -\frac{1}{t}[\cos t - 1] \Rightarrow \boxed{\frac{1-\cos t}{t}}$$ Ans

Result – if $\lim_{n\to\infty} \frac{1}{n} \sum_{k=1}^{n} f\left(\frac{k}{n}\right)$

then $\int_0^1 f(x)\,dx$ ⟵ [put $\frac{k}{n} = x$]

Result 2 if $\lim_{n\to\infty} \frac{1}{n} \sum_{k=1}^{n} f\left(\frac{kc}{n}\right)$

[where c is constant]

then $\int_0^1 f(cx)\,dx$ ⟵ [put $\frac{k}{n} = x$]

use Result 2