QUESTION

Determine whether the function $f(t) = \sin(3t)$ is periodic and, if so, find the smallest period.

ANSWER

$f(t + T) = \sin(3(t + T)) = \sin(3t + 3T), = \sin(3t)$ if $3T = 2n\pi$

i.e. $T = \dfrac{2\pi n}{3}$, $(n = 1, 2, 3, \ldots)$

Therefore the function is periodic with minimum period $\dfrac{2\pi}{3}$.