

Question 33949 General equation of harmonic motion is $x = A \cos(\omega t + \delta)$. Cyclic frequency might be found knowing the period T : $\omega = \frac{2\pi}{T}$. Since there were 150 oscillations in 5 min, period is $T = 2s$ and frequency is $\omega = \frac{2\pi}{2} = \pi$. The amplitude is $A = 5$ and initial phase is $\delta = \frac{\pi}{4}$. Hence, the equation of motion is $x = 5 \cos(\pi t + \frac{\pi}{4})$.

Maximum velocity is $v_{max} = \omega A = 5\pi$.