Consider a mass-spring system. Use dimensional analysis on the force law:
\[ F = m a = m \frac{d^2 x}{dt^2} = -k x. \]

Identify one of the following expressions which has the same dimension as that of the angular velocity \( \omega \).

A) \[ \omega = \frac{k}{m}. \]

B) \[ \omega = \sqrt{\frac{k}{m}}. \]

C) \[ \omega = \frac{m}{k}. \]

D) \[ \omega = \sqrt{\frac{m}{k}}. \]

Use the bracket notion for “dimension of…”

Since

\[ \omega = \frac{2 \pi}{T}, \]

\[ [\omega] = \frac{1}{T}, \]

Since, \( F = m a = -k x \)

\[ \frac{k}{m} = -\frac{a}{x}, \]

\[ \left[ \frac{a}{x} \right] = \frac{T^2}{L} \]

\[ \left[ \sqrt{\frac{k}{m}} \right] = \frac{1}{T}. \]

Answer B.