b) Suppose \( n = 2 \): \( \Gamma \left( \frac{1}{2} \right) = \sqrt{\pi} \), \( \Gamma \left( \frac{1}{2} + \frac{1}{2} \right) = \Gamma(1) = 1 \)

\[
\gamma = \sqrt{\frac{2\pi m}{E}} \sqrt{\frac{E}{\hbar^2}} \sqrt{\pi} = 2\pi \sqrt{\frac{m}{2\hbar}}
\]

Standard result for harmonic oscillator.

c) Suppose \( V = \frac{1}{2}kx^2 + nx \rightarrow \infty \). Then \( |x|^n \rightarrow 0 \) for \( |x| < 1 \)

\( \rightarrow \infty \) for \( |x| > 1 \)

\( \gamma = 2\sqrt{\frac{2m}{E}} \)

For a square well, \( E = \frac{1}{2}mv^2 \), \( x \) period

\[
\gamma = \frac{\text{distance}}{\text{velocity}} = \frac{2 \times 2}{\sqrt{2mE/\hbar}} = 2\sqrt{\frac{2m}{E}} \text{ which checks.}
\]

d) For \( n = 1 \), \( \Gamma(1) = 1 \) and \( \Gamma(1 + \frac{1}{2}) = \frac{1}{1} \Gamma\left( \frac{1}{2} \right) = \frac{1}{2}\sqrt{\pi} \)

\[
\gamma = 4\sqrt{\frac{2m}{E}} \frac{E}{\hbar} = 4\sqrt{\frac{2mE}{\hbar}} \text{. But } E = \frac{1}{2}mv_0^2 \rightarrow
\]

\[
\gamma = \frac{4mv_0}{\hbar}
\]

which agrees with problem 1C.1.7 when \( \hbar = \frac{\pi}{2} \).