**Example.** Consider the constant-coefficient ODE

\[ y'' + \lambda y = 0 \]

(a) Find all values of the real constant \( \lambda \) such that a (nonzero) periodic solution \( y(t) \) exists.

(b) Let \( \lambda = 9 \) and find \( y(t) \) satisfying the IC.s \( y(0) = 0 \) and \( y'(0) = -2 \). If \( y(t) \) is periodic, then determine the period and amplitude of the oscillation.
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