7.24) PROVE THAT THE FUNCTION

$$\psi = Ae^{ikx} + Be^{-ikx}$$

SATISFIES $\psi'' = -k^2\psi$ FOR ANY A & B.

TAKE DERIVATIVES

$$\psi' = \frac{d\psi}{dx} = ikAe^{ikx} - ikBe^{-ikx}$$

$$\psi'' = \frac{d^2\psi}{dx^2} = (i)^2k^2Ae^{ikx} + (i^2)Be^{-ikx}$$

$$= -k^2Ae^{ikx} - k^2Be^{-ikx}$$

$$= -k^2\left(Ae^{ikx} + Be^{-ikx}\right)$$

THUS

$$\boxed{\psi'' = -k^2\psi}$$

SINCE THE VALUES OF A & B WERE "INERT" IN THIS DERIVATION, IT IS INDEPENDENT OF THEIR VALUES.

$\Rightarrow$ TRUE FOR ALL A & B!