opg 8

$$u = e^{-\omega^2 c^2 t} \cdot \cos(\omega x)$$

We insert it into the heat equation.

$$\frac{du}{dt} = c^2 \frac{d^2 u}{dx^2}$$

$$\frac{d}{dt} e^{-\omega^2 c^2 t} \cdot \cos(\omega x) = c^2 \frac{d^2}{dx^2} \cdot e^{-\omega^2 c^2 t} \cdot \cos(\omega x)$$

$$-\omega^2 c^2 e^{-\omega^2 c^2 t} \cdot \cos(\omega x) = c^2 \cdot \frac{d}{dx} \cdot e^{-\omega^2 c^2 t} \cdot \omega \cdot -\sin(\omega x)$$