

$$\psi = A e^{\frac{2\pi i x}{\lambda}} e^{-2\pi i \nu t}$$

only term with  $x$ .

$$p_x = -\frac{i\hbar}{2\pi} \frac{d\psi}{dx}$$

$$\begin{aligned} \frac{d\psi}{dx} &= \frac{2\pi i}{\lambda} A e^{\frac{2\pi i x}{\lambda}} e^{-2\pi i \nu t} \\ &= \frac{2\pi i}{\lambda} \psi. \end{aligned}$$

$$p_x = -\frac{i\hbar}{2\pi} \times \frac{2\pi i}{\lambda} \psi$$

$$= -\frac{i^2 \hbar}{\lambda} \psi$$

$$i^2 = -1.$$

$$p_x = \frac{\hbar}{\lambda} \psi$$

please note: we have simplified the problem for the sake of just helping us learn the maths.