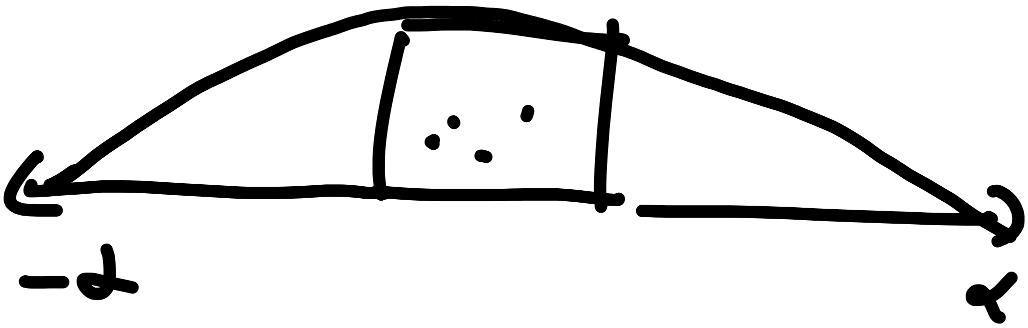
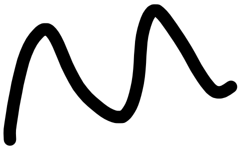
$$\int_{-\infty}^{\infty} \psi(x,t)\,\psi^*(x,t)\,dx = \underline{1}$$



$$\psi(x,t) = A e^{-i/\hbar\,(Et - Px)}$$



$$\psi\cancel{(x,t)} = A e^{-i(\omega t - kx)}$$

$$= A e^{-i\omega(t - x/v)}$$

$$= A e$$

$$k = \frac{2\pi}{\lambda} \qquad = A e^{-i\left(\omega t - \frac{\omega}{v} x\right)}.$$

$$E = h\nu = \frac{h}{2\pi} \times 2\pi\nu .$$

$$= \hbar\omega \qquad \omega = E/\hbar$$

$v = \nu\lambda$

$\frac{v}{\nu} = \lambda$

$$p = \frac{h}{\lambda} = \frac{h}{2\pi}\,\frac{2\pi}{\lambda} = \hbar\,\frac{2\pi\nu}{v}$$

$$\frac{p}{\hbar} = \frac{\omega}{v}$$

$$\Psi = A e^{-\frac{i}{\hbar}(Et - px)}$$

$$i\hbar \frac{\partial}{\partial t}\Psi = i\hbar \times \frac{-iE}{\hbar} A e^{-\frac{i}{\hbar}Et} e^{-\frac{i}{\hbar}px}$$

$= \hat{E}\psi$

$$\hat{E}\psi = i\hbar\frac{\partial\psi}{\partial t}$$

$$\boxed{\hat{E} = i\hbar\frac{\partial}{\partial t}}$$

$$\hat{p}\psi = -i\hbar\frac{\partial\psi}{\partial x}.$$

$$\hat{p} = -i\hbar\frac{\partial}{\partial x}$$

$$H = KE + PE$$

$$\hat{E}\psi = \underline{\hat{p}^2}\,\psi + \hat{V}\psi$$

$$\hat{E}\psi = \frac{\hat{p}^2}{2m}\psi + \hat{V}\psi$$

$$\left(i\hbar\frac{\partial\psi}{\partial t}\right) = \frac{\left(-i\hbar\frac{\partial}{\partial x}\right)^2}{2m}\psi + V\psi$$

$$\boxed{i\hbar\frac{\partial\psi}{\partial t} = -\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x^2}\psi + V\psi}$$

SE

$$\psi = A e^{-i/\hbar(Et - px)}$$

$$= A\, e^{-i/\hbar Et}\, e^{+i/\hbar px}$$

$$= e^{-i/\hbar Et}\left(A\, e^{i/\hbar px}\right)$$

$$\psi = e^{-i/\hbar Et}\,\phi(x)$$

2b)

$$i\hbar \frac{\partial \psi}{\partial x} = -\frac{\hbar^2}{2m}\frac{d^2\psi}{dx^2} + V\psi$$

$$i\hbar \frac{\partial}{\partial t}\left(e^{-i/\hbar\, Et}\right)\phi(x) = -\frac{\hbar^2}{2m} e^{-i/\hbar\, Et}\frac{d^2\phi}{dx^2} + V e^{-i/\hbar\, Et}\phi(x)$$

$$i\hbar \times -\frac{i}{\hbar} E\, e^{-i/\hbar\, Et}\phi(x) = -\frac{\hbar^2}{2m} e^{-i/\hbar\, Et}\frac{d^2\phi}{dx^2} + V e^{-i/\hbar\, Et}\phi(x)$$

2c

$$\boxed{E\phi(x) = -\frac{\hbar^2}{2m}\frac{d^2\phi}{dx} + V\phi(x)}$$

Time :

$$\frac{2mE}{\hbar^2}\psi(x) = -\frac{d^2\psi}{dx^2} + \frac{2mV\psi}{\hbar^2}$$

Time ind SE

$$\frac{d^2\psi}{dx^2} + \frac{2m}{\hbar^2}(E-V)\psi(x) = 0$$

$$\nabla^2\psi + \frac{2m}{\hbar^2}(E-V)\psi(x)$$

$2 \cdot 8\cos 2x$

$-16$

$$-\frac{d^2}{dx^2}\left(4\sin 2x\right)$$

$8\sin 2x$

$$A\psi = \lambda\psi$$

16

$$-\frac{d^2}{dx^2}(4\sin 2x) = 16\sin 2x$$

$$= 4 \times 4\sin 2x$$

$$\lambda$$

$$-\frac{d^2}{dx^2}(\underbrace{4\sin 2x}_{\psi}) = \underbrace{4}_{=} \times \boxed{4\sin 2x}_{\psi}$$

$$\lambda = \frac{h}{p}.$$

$$\frac{d^2u}{dx^2} = \frac{2m}{\hbar^2}(V-E)u$$

Chem

1, 3, 5,

Present