Infinite Potential well is defined as:

$$V(x) = \begin{cases} 0, & x_c - \frac{L}{2} < x < x_c + \frac{L}{2}, \\ \infty, & \text{otherwise}, \end{cases},$$

the equation

$$\frac{d^2\psi}{dx^2} = -\frac{2E}{\hbar^2}\psi$$
$$E_n = \frac{n^2\pi^2\hbar^2}{2mL^2}$$

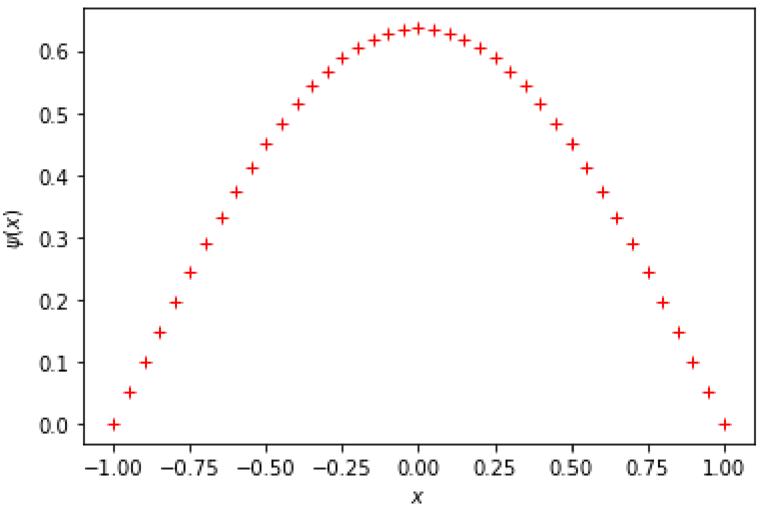
In [1]:

```
from My_Lib import*
import numpy as np
import matplotlib.pyplot as plt
import math

a=2 #width of the well
#For 1st energy state
n=1
E=math.pi**2*n**2/(2*1*a**2) #Energy in the units of h cut, mass,m=1



def d2ydx2(x, y, z): #defining 2nd order functions
    return -2*E*y


def dydx(x, y, z):
    return z

x, y, z = shooting_method(d2ydx2, dydx, -a/2, 0, a/2, 0, 1, 2, 0.05) #Calling the shoot
ing method

print("The plot using Shooting method for n=1 level is ") #Plotting the solution
plt.plot(x,y,'r+')
plt.xlabel("$x$")
plt.ylabel("$\psi(x)$")
```

```
The plot using Shooting method for n=1 level is
```

Out[1]:

```
Text(0, 0.5, '$\\psi(x)$')
```



In [11]:

```
#For 2nd energy state
n=2
a=2#width of the well
E=math.pi**2*n**2/(2*1*a**2)#Energy in the units of h cut, mass,m=1



def d2ydx2(x, y, z):
    return -2*E*y


def dydx(x, y, z):
    return z

x, y, z = shooting_method(d2ydx2, dydx, -a/2, 0, a/2, 0, 0.1, 5, 0.05) #Calling shootin
g method
print("The plot using Shooting method for n=2 level is ")
plt.plot(x,y,'r*') #Plotting the solution
plt.xlabel("$x$")
plt.ylabel("$\psi(x)$")
```

```
The plot using Shooting method for n=2 level is
```

Out[11]:

```
Text(0, 0.5, '$\\psi(x)$')
```