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```
In [1]: import matplotlib.pyplot as plt
import odeSolver as os
import numpy as np
```

## Problem 2

BVP:

Where 
$$x\in[0,2], y(0)=0, y(2)=-4, h=0.2$$

The exact solution is

$$y(x) = rac{1}{6} x^3 e^x - rac{5}{3} x e^x + 2 x e^x - x - 2$$

```
In [2]: p = -2

q = 1

fprime = lambda x : x*np.exp(x)-x

f = lambda x : 1/6*x**3*np.exp(x) - 5/3*x*np.exp(x) + 2*np.exp(x) - x - 2
```

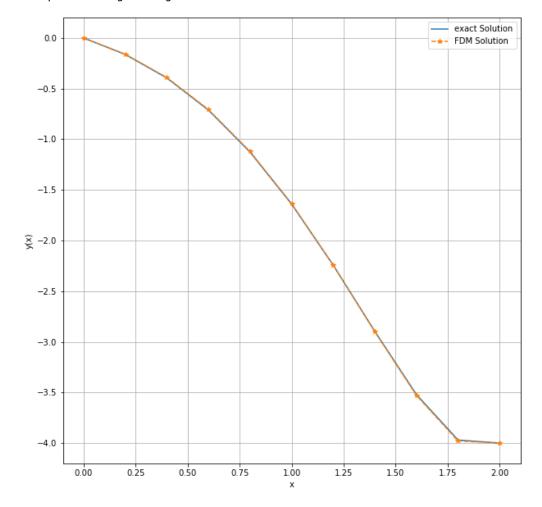
```
In [3]:  ta = 0 
 ya = 0 
 tb = 2 
 yb = -4 
 h = 0.2 
 y,x = os.solveODE2(fprime,p,q,ta,ya,tb,yb,h=h)
```

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```
In [5]: plt.figure(figsize=(10,10))
    plt.plot(x,f(x),label='exact Solution')
    plt.plot(x,y,'--*',label= 'FDM Solution')

    plt.xlabel('x')
    plt.ylabel('y(x)')
    plt.grid()
    plt.legend()
```

Out[5]: <matplotlib.legend.Legend at 0x7fdf4b1c6da0>



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