Homework Assignment 1  
Math 472, Numerical Analysis II  
Prepared by Dr. Kareem Elgindy  
Due Date: 04:45 pm on 25/09/2019

“In the following questions retain at least FOUR decimal digits in all arithmetic operations of your answers. Use rounding to the nearest to round all your approximations.”

**Question 1. [2 marks]** Evaluate \( \lim_{{x \to 0}} \frac{x^2 e^x}{\cos x - 1} \) using Taylor series.

**Question 2. [4 marks]** Solve Question 11 in Exercise Set 1.1 of the Textbook.

**Question 3. [4 marks]** Solve Question 13.b. in Exercise Set 3.1 of the Textbook.

**Question 4. [2 marks]** Solve Question 11 in Exercise Set 3.3 of the Textbook.

**Question 5. [4 marks]** Solve Question 17.a. in Exercise Set 3.3 of the Textbook.  
(Approximate the population in the year 1975 only.)

**Question 6. [4 marks]** Using Algorithm 3.2 in the Textbook and the data table below, write a MATLAB code to approximate \( y \) at \( x = 6 \). Show the results of executing the code.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>5</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>y</strong></td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>11</td>
<td>15</td>
</tr>
</tbody>
</table>