**Section 3.1:**
1. (6 pts.) For each of the following functions let $x_0 = 1.0$, $x_1 = 1.5$ and $x_2 = 1.8$. Construct Lagrange interpolating polynomials of degree (at most) two using $x_0$, $x_1$, and $x_2$, to approximate $f(1.4)$, and find the absolute error in each case using 6-digit chopping for the final answer:
   (a) $f(x) = \sin x + \cos x$
   (b) $f(x) = x \ln x$

2. (4 pts.) Use the error bound formula of Theorem 3.3 to estimate the errors for the approximations used in both (a) and (b) of Question #1.

**Section 3.2:**
3. (4 pts.) Use the divided-difference formula of Equation 3.10 to construct interpolating polynomials of degree three for the following data, and find the approximate values using the interpolating polynomials in each case: Approximate $f(0.25)$ if $f(0.0) = 0.00000, f(0.20) = 0.202710, f(0.40) = 0.422793$, and $f(0.60) = 0.684136$ assuming 6-digit chopping arithmetic is used.

4. (6 pts.) Repeat Question #3 by using the Newton forward-difference formula (Equation 3.12, or equivalently, Equation 3.11) and Newton backward-difference formula (Equation 3.13) to construct the interpolating polynomial.

**Section 3.3:**
5. (5 pts.) Use Theorem 3.9 to construct the Hermite polynomial of degree three using the following data with 6-digit chopping:

<table>
<thead>
<tr>
<th>$x$</th>
<th>$f(x)$</th>
<th>$f'(x)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>1.96475</td>
<td>4.86028</td>
</tr>
<tr>
<td>1.2</td>
<td>2.57215</td>
<td>7.61596</td>
</tr>
</tbody>
</table>

6. (5 pts.) Use the following Hermite interpolating polynomial formula of the textbook (p. 133)

$$H_{2n+1}(x) = f[z_0] + \sum_{k=1}^{2n+1} f[z_0, \ldots, z_k](x - z_0)(x - z_1)\cdots(x - z_{k-1}).$$

and the data from Question #5 to approximate $f(1.16)$, and compute the absolute error assuming the function $f(x) = \tan x$ and using 6-digit chopping arithmetic.