1) **Statistical Analysis and Error, and Radioactive Decay** – A student measures the mass of an ingot of uranium metal to be $57.00 \pm 1.30\text{g}$
   a) What is the absolute error of this measurement? [1 pt]

   b) What is the relative error for this measurement? [1 pt]

   c) If after 100 years there is only $20.76\text{g}$ remaining, what is the decay constant $\lambda$ (make sure to include units)? [2 pts]

   d) What is the half life? [2 pts]

   e) (Bonus Point) In particular, we have been looking at the uranium isotope $U^{232}_{92}$. If $U^{232}_{92}$ decays principally to $Th^{228}_{90}$ what is the decay mechanism? [1 pt]

      A) $\alpha$ decay
      B) $\beta$ decay
      C) $\gamma$ decay
2) **Random Statistics** – A fair, 2 sided, coin is flipped 100 times. The results are shown below:

<table>
<thead>
<tr>
<th>Heads</th>
<th>Tails</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>46</td>
</tr>
</tbody>
</table>

a) What is *absolute uncertainty* for this number of trials? [1 pt]

b) What is the *relative uncertainty* for this number of trials? [1 pt]

c) Would you consider the above results a probable outcome? Why or why not? [2 pts]