Question One (5-Points)
Write **True** if the statement is true or **False** if not:
1. The sampling error of the sample proportion \( \hat{p} \) may be negative: **True**
2. The sampling distribution of the sample mean of a random sample from a normal population is always normal regardless of the sample size: **True**
3. As the sample size increases the sampling error always decreases: **False**
4. The standard error of the sample mean \( \bar{x} \) may change from sample to sample of the same size: **False**
5. Different samples of the same size may yield different sampling error: **True**

Question Two (5-Points)
A population is normally distributed, with a mean of 1,000 and a standard deviation of 200. Use this information to answer the following two questions (1, 2):
1. The probability that a random sample of size 5 selected from this population will have a sample mean less than 970 is:
   a. 0.2734  b. 0.2266  c. 0.7266  d. 0.3669
2. The probability that a random sample of size 25 selected from this population will have a sample mean between 980 and 1020 is equal to:
   a. 0.1915  b. 0.3830  c. 0.9876  d. None

Given a population in which the probability of success is \( p = 0.40 \), if a sample of 1000 is taken, use this information to answer the following three questions (3, 4 and 5):

3. If the sample yields 420 success items, then the sampling error for this sample is:
   a. -0.02  b. 0.02  c. 0.16  d. 0.18

4. The probability that the proportion of success in the sample is less than 0.44 is equal to:
   a. 0.9951  b. 0.0049  c. 0.4951  d. None

5. If the \( P(\hat{p} > p_0) = 0.0985 \) then the value of \( p_0 \) equals to:
   a. 0.42  b. 0.44  c. 0.4  d. None

**NOTE:** you may use One of the following areas, where

<table>
<thead>
<tr>
<th>( z_0 )</th>
<th>0.29</th>
<th>0.34</th>
<th>0.5</th>
<th>0.75</th>
<th>1.29</th>
<th>2.58</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P(0 &lt; Z &lt; z_0) )</td>
<td>0.1141</td>
<td>0.1331</td>
<td>0.1915</td>
<td>0.2734</td>
<td>0.4015</td>
<td>0.4951</td>
</tr>
</tbody>
</table>