HW:

1. On the average, hotel guests who take elevators weigh about 150 pounds with an SD of about 35 pounds. An engineer is designing a large elevator for a convention hotel, to lift 50 such people. If she designs it to lift 4 tons, the chance that it will be overloaded by a random group of 50 people is about ________________.

2. A university has 25,000 students, of whom 17,000 are undergraduates. The housing office takes a simple random sample of 500 students; 357 out of the 500 are undergraduates. Fill in the blanks.
   a) For the number of undergraduates in the sample, the observed value is _______ but the expected value is ______________.
   b) For the percentage of undergraduates in the sample, the observed value is _______ but the expected value is ______________.

3. The Residential Energy Consumption Survey found in 2001 that 47% of American households had internet access. A market survey organization repeated this study in a certain town with 25,000 households, using a simple random sample of 500 households: 239 of the sample households had internet access.
   a) The percentage of households in the town with internet access is estimated as _______; this estimate is likely to be off by _________ or so.
   b) If possible, find a 95%-confidence interval for the percentage of all 25,000 households with internet access. If this is not possible, explain why not.

4. Of the 500 sample households in the previous exercise, 7 had three or more large-screen TVs.
   a) The percentage of households in the town with three or more large-screen TVs is estimated as ___________; this estimate is likely to be off by ___________ or so.
   b) If possible, find a 95%-confidence interval for the percentage of all 25,000 households with three or more large-screen TVs. If this is not possible, explain why not.

5. A box of tickets averages out to 75, and the SD is 10. One hundred draws are made at random with replacement from this box.
   a) Find the chance that the average of the draws will be in the range 65 to 85.
   b) Repeat, for the range 74 to 76.

6. A university has 30,000 registered students. As part of a survey, 900 of these students are chosen at random. The average age of the sample students turns out to be 22.3 years, and the SD is 4.5 years.
a) The average age of all 30,000 students is estimated as ________. This estimate is likely to be off by ________ or so.

b) Find a 95% confidence interval for the average age of all 30,000 registered students.

7. Fill in the table below, for draws made at random with replacement from the box containing following numbers: 0, 2, 3, 4 and 6.

<table>
<thead>
<tr>
<th>Number of draws</th>
<th>EV for sum of draws</th>
<th>SE for sum of draws</th>
<th>EV for average of draws</th>
<th>SE for average of draws</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

8. A box of tickets has an average of 100, and an SD of 20. Four hundred draws will be made at random with replacement from this box.

a) Estimate the chance that the average of the draws will be in the range 80 to 120.

b) Estimate the chance that the average of the draws will be in the range 99 to 101.