Version 1 (Magnus scores 690)

1. a) 1.24  
   b) …1.24 standard deviations above the mean score.  
   c) 32.0  

2. $98.20 + 1.48(0.58) = 99.056$  

3. a) $Z = -0.2381; \text{Prob} = 0.4059$  
   b) Normal, $150,215/\sqrt{40} = 3.32$  
   c) $Z = -1.51; \text{Prob} = 0.0661$  
   d) $6.61\%$ of all samples of 40 (weeks) have (sample) mean less than 145kg.  
   e) Part a is no longer appropriate; part b is (Central Limit Theorem).  

4. Point estimate $= 0.592; Z = 2.576; \text{Error margin} = 2.756 \sqrt{\frac{0.592(0.408)}{866}} = 0.044$  
   $0.549 < p < 0.636$  

5. A single puppy has highest prob; 24 puppies have lowest  

6. a) $\hat{p} = 0.96; \text{statistic}$  
   b) $p = 0.95; \text{parameter}$  

7. a) 95%  
   b) $27\% \pm 6\%$ or $0.21 < p < 0.33$  

8. a) Point estimate $= 0.79; \text{Error Margin} = 0.07$  
   b) NO. “We have 90% confidence that between 76% and 88% of all students are opposed to the proposal.”  

9. None.  

10. 0.04 (answers of 0.02 and 0.01 got partial credit)  

11. a) 43%  
    b) 78%
Version 2 (Magnus scores 730)

1. a) 1.53
   b) …1.53 standard deviations above the mean score.
   c) 31.75

2. \(98.20 + 1.88(0.62) = 99.366\)

3. a) \(Z = -0.3125\); Prob = 0.3773
   b) Normal, 150, \(\frac{16}{\sqrt{50}} = 2.26\)
   c) \(Z = -2.21\); Prob = 0.0136
   d) 1.36\% of all samples of 50 (weeks) have (sample) mean less than 145kg.
   e) Part a is no longer appropriate; part b is (Central Limit Theorem).

4. Point estimate = 0.576; \(Z = 1.645\); Error margin = \(1.645 \sqrt{\frac{0.576(0.424)}{1668}} = 0.020\).
   \(0.556 < p < 0.596\)

5. A single puppy has highest prob; 24 puppies have lowest

6. a) \(p = 0.94\); parameter   b) \(\hat{p} = 0.97\); statistic

7. a) 95\%   b) 29\% ± 4\% or 0.25 < \(p < 0.33\)

8. a) Point estimate = 0.72; Error Margin = 0.06
   b) NO. “We have 90\% confidence that between 76\% and 88\% of all students are opposed to the proposal.”

9. None.

10. 0.04 (answers of 0.02 and 0.01 got partial credit)

11. a) 78\%
    b) 43\%
Question 3 parts a through c corresponded almost exactly to a similar set of questions on a homework assignment. (The questions on the midterm were easier, because they simply involved less than statements – which the table gives probabilities for directly – whereas the homework question required additional steps of obtaining 2 z scores and then subtracting the corresponding tabled probabilities.

Here’s a breakdown – summarizing the midterm performance on these two questions for three groups of people: Those who got these (similar) questions correct on the homework; those who did not; and those who did not submit the homework.

<table>
<thead>
<tr>
<th>Performance on the homework</th>
<th>Performance on the midterm</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>Correct</td>
<td>21</td>
</tr>
<tr>
<td>Not correct</td>
<td>Correct</td>
<td>22</td>
</tr>
<tr>
<td>Didn’t submit</td>
<td>Correct</td>
<td>6</td>
</tr>
</tbody>
</table>

Likelihood Ratio Chi-Square = 0.052, DF = 1, P-Value = 0.820.

The observed differences in these groups are consistent with the types of differences that would occur if succeeding on (and even doing!) homework is unrelated to succeeding on midterms.