1) 

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>7.5</td>
<td>8.25</td>
</tr>
<tr>
<td>7.75</td>
<td></td>
</tr>
<tr>
<td>8</td>
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</table>

**Column 1**

<table>
<thead>
<tr>
<th>Mean</th>
<th>7.7</th>
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<tbody>
<tr>
<td>Standard Error</td>
<td>0.215058</td>
</tr>
<tr>
<td>Median</td>
<td>7.75</td>
</tr>
<tr>
<td>Mode</td>
<td>#N/A</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.480885</td>
</tr>
<tr>
<td>Sample Variance</td>
<td>0.23125</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.021914</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.590129</td>
</tr>
<tr>
<td>Range</td>
<td>1.25</td>
</tr>
<tr>
<td>Minimum</td>
<td>7</td>
</tr>
<tr>
<td>Maximum</td>
<td>8.25</td>
</tr>
<tr>
<td>Sum</td>
<td>38.5</td>
</tr>
<tr>
<td>Count</td>
<td>5</td>
</tr>
<tr>
<td>Confidence Level</td>
<td>0.458471</td>
</tr>
<tr>
<td><strong>Lower</strong></td>
<td><strong>Upper</strong></td>
</tr>
<tr>
<td>7.241529</td>
<td>8.158471</td>
</tr>
</tbody>
</table>

2) 

$$z = \frac{400 - 280}{40} = 3$$

a. At most $1/k^2 = 1/9$

b. Using Empirical rule, almost no probability.

3) 

**Let** $P(A) = .8$, $P(B) = .6$, $P(A \ or \ B) = .90$

a. Find $P(A \ and \ B)$, $P(A^c \ and \ B)$, and $P(A \ or \ B^c)$.

$$P(A \ and \ B) = P(A) + P(B) - P(A \ or \ B) = 1.4 - .9 = .5$$

$$P(Ac \ and \ B) = P(B) - P(A \ and \ B) = .6 - .5 = .1$$

$$P(A \ or \ Bc) = P(A) + P(Bc) - P(A \ and \ Bc) = .8 + .4 - (.8-.5) = 1.2-.3 = .9$$

b. Are $A$ and $B$ mutually exclusive? Are they independent? Be sure to support your answers.

Not ME as $A$ and $B$ overlap.

Not independent as $P(A \ and \ B) \ net = P(A)*P(B)$
4)

a. 
P(Good) = .6, P(Not Good) = .4
P(P given Good) = .8
P(P given Not Good) = .1

<table>
<thead>
<tr>
<th></th>
<th>Good</th>
<th>Not Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>.8(.6)=.48</td>
<td>.1(.4)=.04</td>
</tr>
<tr>
<td>Not Pass</td>
<td>.2(.6) =.12</td>
<td>.9(.4)=.36</td>
</tr>
</tbody>
</table>

P(P) = .52

c) P(G given P) = P(G and P)/ P(P) = .48/.52 = 12/13

4)

a. 

<table>
<thead>
<tr>
<th>X</th>
<th>P(X)</th>
<th>X*P(X)</th>
<th>(X-mu)^2*P(X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.3</td>
<td>0</td>
<td>0.363</td>
</tr>
<tr>
<td>1</td>
<td>0.4</td>
<td>0.4</td>
<td>0.004</td>
</tr>
<tr>
<td>2</td>
<td>0.2</td>
<td>0.4</td>
<td>0.162</td>
</tr>
<tr>
<td>3</td>
<td>0.1</td>
<td>0.3</td>
<td>0.361</td>
</tr>
</tbody>
</table>

mu = 1.1
sigma^2 = 0.89
sigma = 0.943

b. Prob. Any one student will miss more than 1.4 classes = P(2)+P(3)=.3
But the Prob. Average number of cuts from random sample of 100 will exceed
is based on CLT that states that, for large n, the sampling distribution of the
sample mean is normal with mean mu and s.d. = sigma/sqrt(n) = .89/sqrt(100)
=0.89/10 = 0.089

So z(x-bar) = (x-bar-mu)/sigma(x-bar) = (1.4-1.1)/.089 = .3/.089 = 3.371
So the Prob x-bar > 1.4 is almost 0.

6)

a. P(not listed) = .2, n = 25, so use Table II
P(X>=6+ = 1-P(x<=5) = 1-.617 = .383

b. n=200, find P(145 <= x <= 165)
Using the computer find binomdist(165,200,.8,true) - binomdist(144,200,.8,true)
that is P(x <= 165) - P(x <= 144) = 0.834393 minus 0.004
= 0.8304

W/o computer, approximate using normal (why not Poisson?)


\[
\mu = np = 160, \ sigma = \sqrt{np(1-p)} = 5.656
\]

Using the continuity adjustment factor of plus/minus .5, we find

\[
z(165.5) = (165.5-160)/5.656 = 0.97
\]

\[
z(144.5) = (144.5-160)/5.656 = -2.74
\]

From normal tables you get the sum of two areas

\[
\begin{align*}
0.834578851 \\
-0.003067786 \\
0.831511066
\end{align*}
\]

close to the same as with Binomial

7) \( p = .01, n = 350, \) so use the Poisson(why?)

\[
np = \lambda = 3.5; \ our \ table \ has \ 3.4 \ and \ 3.6. \ Can \ use \ the \ computer \ to \ find
\]

\[
P(X>5) = 1-P(X<=5)
\]

\[
= 1-0.857614 = 0.142
\]

From table for \( \lambda = 3.4, \) we get 0.870542

From table for \( \lambda = 3.6, \) we get 0.844119

The average is 0.85733

1-.857 = 0.14267 close again

8)

a. \( \mu = (10+70)/2 = 40k \)

\( \sigma = (70-10)/\sqrt{12} = 17.32051 \)

b) \( P(x>50k) = (70-50)/(70-10) = 1/3 \)

c. \( P(25<x<30) = (30-25)/60 = 1/12 \)