DO NOT TURN TO THE QUESTIONS UNTIL TOLD TO DO SO!

NAME: ________________________________

PERM #: ______________________________

NAME OF YOUR TA: ______________________

HOURS OF YOUR DISCUSSION SECTION: __________________

INSTRUCTIONS: You have 1 hour and 15 minutes to complete this exam. You should attempt ALL questions. You are allowed to consult your textbook and class notes. In order to receive full credit, you need to show your work. Anyone found copying another students’ work will be given zero score.

<table>
<thead>
<tr>
<th>Questions</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Points available</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>Points awarded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GOOD LUCK!!!
1. The probability distribution of a discrete random variable X is shown in the following table:

<table>
<thead>
<tr>
<th>x</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(X=x)</td>
<td>0.2</td>
<td>0.3</td>
<td>p</td>
<td>0.1</td>
<td>0.2</td>
</tr>
</tbody>
</table>

(a) Find the missing value p.
(b) Find P(X<2).
(c) Find mean and variance of the random variable X.
2. The following are ages of 5 UCSB students, randomly selected from those who have lunch in the UCen:

\[21, 18, 19, 31, 22\]

(i) Find mean, median and inter-quartile range.
(ii) Construct box plot.
(iii) What percentage of the students are teenagers?
3. When I play soccer, one outcome of interest is the result of the game. The possibilities are that my team wins, loses, or ties. Another outcome of interest is whether or not I score (at least one goal). You are given the following probabilities: the probability that I score and my team wins is .3; the probability that I score and my team loses is .15; the probability that my team wins is .4; the probability that my team loses is .5; the probability that I score is .5.

(i) Given that my team wins, what is the probability that I score?
(ii) Given that I score, what is the probability that my team wins?
(iii) What is the probability that my team loses or I do not score?
(iv) What is the probability that I do not score and my team ties?
4. The menu at the Coffee Garden at 900 East and 900 South in Salt Lake City has included a scrumptious selection of quiche for about 10 years. The recipe calls for four fresh eggs for each quiche. A Salt Lake County Health Department Inspector paid a visit recently and pointed out that research by the Food and Drug Administration indicates that one in four eggs carries salmonella bacterium, so restaurants should never use more than three eggs when preparing quiche. The manager on duty wondered aloud if simply throwing out three eggs from each dozen and using the remaining nine in four-egg-quiches would serve the same purpose. The inspector wasn’t sure, but she said she would research it. Salt Lake Tribune, 11 October 2002.

(a) What is the probability that

(i) of 4 randomly selected eggs, at least one carries salmonella bacterium?
(ii) of 3 randomly selected eggs, at least one carries salmonella bacterium?

(b) How many eggs would you expect to carry salmonella bacterium our of

(i) 3 randomly selected eggs?
(ii) 4 randomly selected eggs?
5. Tom and Dick took the same class. The final scores for the class were normally distributed with mean 75 and standard deviation 10. Tom’s score was 60 and Dick’s score is better than 80%, but worse than 20% of all scores.

(i) What is Dick’s score?
(ii) What proportion of scores is better than Tom’s?