1. The budgeting process for a midwestern college resulted in expense forecasts for the coming year \( (x) \), which is in millions of dollars. Because the actual expenses are unknown, the following table gives the respective probabilities that were assigned.

<table>
<thead>
<tr>
<th>( x )</th>
<th>( f(x) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.23</td>
</tr>
<tr>
<td>24</td>
<td>0.17</td>
</tr>
<tr>
<td>31</td>
<td>0.28</td>
</tr>
<tr>
<td>35</td>
<td>0.32</td>
</tr>
</tbody>
</table>

a. Is this a valid probability distribution?  
_________________

b. What is the probability that the expense forecast for the coming year equals 31 million dollars? (Report your answer using 2 decimal places)  
_____  

c. What is the probability that the expense forecast for the coming year is less than or equal to 24 million dollars? (Report your answer using 2 decimal places)  
_____  

d. What is the probability that the expense forecast for the coming year is greater than 31 million dollars? (Report your answer using 2 decimal places)  
_____  

e. What is the expected expense forecast? (Report your answer using 4 decimal places)  
_____  

f. What is the standard deviation of the expense forecast? (Report your answer using 4 decimal places)  
_____  

2. The unemployment rate is 8.3%. Assume that 14 employable people are selected randomly.
   a. The probability that 3 people in the survey are unemployed equals ____ . (to 4 decimals)

   b. The probability that at most 3 people in the survey are unemployed equals ____ . (to 4 decimals)

   c. The expected number of people who are unemployed equals ____ . (to 3 decimals)

   d. The standard deviation of the number of people who are unemployed equals ____ (to 3 decimals)
e. The probability that 11 people in the survey are employed equals ____ . (to 4 decimals)

f. The probability that at most 11 people in the survey are employed equals ____ . (to 4 decimals)

g. The expected number of people who are employed equals ____ . (to 3 decimals)

h. The standard deviation of the number of people who are employed equals ____ . (to 3 decimals)

3. Airline passengers arrive randomly and independently at the passenger-screening facility at a major international airport. The mean arrival rate is 6.9 passengers per minute.

a. Compute the probability of no arrivals in a one-minute period (to 6 decimals).

b. Compute the probability that three or fewer passengers arrive in a one-minute period (to 4 decimals).

c. What is the expected number of arrivals in a 15-second period (to 4 decimals).

d. What is the variance of the number of arrivals in a 15-second period (to 4 decimals).

e. Compute the probability of no arrivals in a 15-second period (to 4 decimals).

f. Compute the probability of at least one arrival in a 15-second period (to 4 decimals).