1. Click on “Begin Assessment” button.
2. Scroll down to begin quiz.
1. If a couple has three children, let $X$ represent the number of girls. Does the table below show a correct probability model for $X$?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion</td>
<td>0.125</td>
<td>0.375</td>
<td>0.375</td>
<td>0.125</td>
</tr>
</tbody>
</table>

No, because there are other values that $X$ could be.

No, because it is not possible for $X$ to be equal to 0.

Yes, because all combinations of children are represented.

Yes, because all probabilities are between 0 and 1 and they sum to 1.
2. Using the table in Question 1, what is the probability that the couple does not have girls for all three children?

3. Using the table in Question 1, what is the probability that the couple has either one or two girls?
4. A vending machine has been known to be “finicky,” that is, it will only sometimes accept dollar bills that are fed into it. Let $X$ represent the number of bills accepted out of the last four tried. Does the table below show a correct probability model for $X$?

<table>
<thead>
<tr>
<th>$X$</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion</td>
<td>0.04</td>
<td>0.09</td>
<td>0.13</td>
<td>0.36</td>
<td>0.44</td>
</tr>
</tbody>
</table>

No, because the sample space is missing values for $X$.
No, because the probabilities do not sum to 1.
Yes, because all of the probabilities are between 0 and 1.
Yes, because all probabilities and all values for $X$ are represented.
5. A random number generator was used to generate random numbers along the interval from $-2$ to 2. The density curve of the generated data is shown below. What proportion of values will lie between $-1.75$ to 2?
6. A random number generator was used to generate random numbers along the interval from 1 to 5. The density curve of the generated data is shown below. At what value, $y$, must the blue line be placed in order to have 20% of the data between 1 and $y$?
7. Soda bottles are filled with volumes that are normally distributed with mean volume 12 ounces and a standard deviation of 0.15 ounce. Acceptable limits of volume are between 11.80 and 12.20 ounces. What proportion of bottles are filled to an unacceptable limit?
Click on the button below to see how you did.

Questions correct:

Percentage correct:

Click on the “Correct” button to highlight your correct answers in green and wrong answers in red. For question solutions either:

• shift-click on the “Ans” button that appears next to the free-response box or

• shift-click on the correct answer for the multiple choice questions.
Solutions to Quizzes

Solution to Quiz:  1. No additional information.

End Quiz
Solution to Quiz: 2. Since we want to find the probability that they do not have three girls, that is found by
\[ 1 - P(\text{they have three girls}) = 1 - 0.125 = 0.875. \]

End Quiz
Solution to Quiz: 3. Since these events are disjoint, we can simply add the probabilities. So \( P(\text{the couple has either one or two girls}) = P(\text{the couple has one girl}) + P(\text{the couple has two girls}) = 0.375 + 0.375 = 0.75. \)

End Quiz
Solution to Quiz: 4. Because the sum of the probabilities ($0.04 + 0.09 + 0.13 + 0.36 + 0.44 = 1.06 \neq 1$), it is not a valid probability model.
Solution to Quiz: 5. No additional information.

End Quiz
Solutions to Quizzes

Solution to Quiz: 6. Since we want to cover 20% of the data, we need to be 20% from the left-side of the plot. That value is found at 1.8.
Solution to Quiz: 7. By looking at the following graph, you can see the desired probability is the area found in the tails of the distribution.

If we let $X$ by the volume in one can, the desired probability is one minus the probability of being between the two limits.
Solutions to Quizzes

Or,

\[ = 1 - P(11.8 \leq X \leq 12.2) \]

\[ = 1 - P \left( \frac{11.8 - 12}{0.15} \leq \frac{X - 12}{0.15} \leq \frac{12.2 - 12}{0.15} \right) \]

\[ = 1 - P(-1.33 \leq Z \leq 1.33) \]

\[ = 1 - (0.9082 - 0.918) \]

\[ = 1 - 0.8164 \]

\[ = 0.1836 \]

Note that this can also be found by

\[ P(X \leq 11.8) + P(X \geq 12.2). \]

Both methods will give the same answer.  
End Quiz