

Lesson 2

9/9 points (100%)

Quiz, 9 questions

 **Congratulations! You passed!**[Next Item](#)1 / 1
points

1.

For Questions 1-4, refer to the following table regarding passengers of the famous Titanic, which tragically sank on its maiden voyage in 1912. The table organizes passenger/crew counts according to the class of their ticket and whether they survived.

	Class			
	1st	2nd	3rd	Crew
Survived	203	118	178	212
Did not survive	122	167	528	673

Source: Dawson, Robert J. MacG. (1995), The 'Unusual Episode' Data Revisited. Journal of Statistics Education, 3. <https://www.amstat.org/publications/jse/v3n3/datasets.dawson.html>

Note: Due to increased research interest in the Titanic following the popular 1997 film, it is known that this data set contains slight inaccuracies.

- If we randomly select a person's name from the complete list of passengers and crew, what is the probability that this person travelled in 1st class? Round your answer to two decimal places.

Correct Response

This is $(203 + 122) / 2201$. This is also $P(1st\ class) = P(1st\ class\ and\ survived) + P(1st\ class\ and\ did\ not\ survive)$.

1 / 1
points

Lesson 2

Quiz, 9 questions

2.

Titanic:

9/9 points (100%)

- What is the probability that a (randomly selected) person survived? Round your answer to two decimal places.

0.32

Correct Response

This is $(203 + 118 + 178 + 212) / 2201$. This is also $P(\text{survived}) = P(\text{1st class and survived}) + P(\text{2nd class and survived}) + P(\text{3rd class and survived}) + P(\text{crew and survived})$.



1 / 1
points

3.

Titanic:

- What is the probability that a (randomly selected) person survived, given that they were in 1st class? Round your answer to two decimal places.

0.62

Correct Response

This is $203 / (203 + 122)$. If we divide the numerator and denominator by 2201, this is also $P(\text{survived} \mid \text{1st class}) = P(\text{1st class and survived}) / P(\text{1st class})$.



1 / 1
points

4.

Titanic:

- True/False: The events concerning class and survival are statistically independent.



True

Lesson 2

Quiz, 9 questions



False

9/9 points (100%)

Correct

Note that $P(\text{survived} \mid \text{1st class})$ is not equal to $P(\text{survived})$. Another way to check is to see if $P(\text{survived and 1st class}) = P(\text{survived}) * P(\text{1st class})$.



1 / 1
points

5.

For Questions 5-9, consider the following scenario:

You have three bags, labeled A, B, and C. Bag A contains two red marbles and three blue marbles. Bag B contains five red marbles and one blue marble. Bag C contains three red marbles only.

- If you select from bag B, what is the probability that you will draw a red marble? Express the exact answer as a simplified fraction.

Preview

$$\frac{5}{6}$$

5/6

Correct Response

Your answer, 5/6, is equivalent to the instructor's answer 5/6.



1 / 1
points

Lesson 2

Quiz, 9 questions

9/9 points (100%)

6.

Marbles:

- If you randomly select one of the three bags with equal probability (so that $P(A) = P(B) = P(C) = 1/3$) and then randomly draw a marble from that bag, what is the probability that the marble will be blue? Round your answer to two decimal places.

Hint: This is the marginal probability $P(\text{blue})$. You can obtain this using the law of total probability (which appears in the denominator in Bayes' theorem). It is

$$\begin{aligned} P(\text{blue}) &= P(\text{blue} \cap A) + P(\text{blue} \cap B) + P(\text{blue} \cap C) \\ &= P(\text{blue} | A) \cdot P(A) + P(\text{blue} | B) \cdot P(B) + P(\text{blue} | C) \cdot P(C) \end{aligned}$$

0.26

Correct Response

This is

$$\begin{aligned} P(\text{blue}) &= P(\text{blue} \cap A) + P(\text{blue} \cap B) + P(\text{blue} \cap C) \\ &= P(\text{blue} | A) \cdot P(A) + P(\text{blue} | B) \cdot P(B) + P(\text{blue} | C) \cdot P(C) \\ &= 3/5(1/3) + 1/6(1/3) + 0(1/3) = 1/5 + 1/18 \end{aligned}$$



1 / 1
points

7.

Marbles:

- Suppose a bag is randomly selected (again, with equal probability), but you do not know which it is. You randomly draw a marble and observe that it is blue. What is the probability that the bag you selected this marble from is A? That is, find $P(A | \text{blue})$. Round your answer to two decimal places.

0.78

Correct Response

This is $\frac{P(\text{blue}|A) \cdot P(A)}{P(\text{blue})} = \frac{3/5(1/3)}{3/5(1/3) + 1/6(1/3) + 0(1/3)}.$

Lesson 2

Quiz, 9 questions

1 / 1
points

9/9 points (100%)

8.
Marbles:

- Suppose a bag is randomly selected (again, with equal probability), but you do not know which it is. You randomly draw a marble and observe that it is blue. What is the probability that the bag you selected from is C? That is, find $P(C \mid \text{blue})$. Round your answer to two decimal places.

0

Correct Response

This is $\frac{P(\text{blue}|C) \cdot P(C)}{P(\text{blue})} = \frac{0(1/3)}{3/5(1/3) + 1/6(1/3) + 0(1/3)}$. This answer is intuitive because there are no blue marbles in bag C.

1 / 1
points9.
Marbles:

- Suppose a bag is randomly selected (again, with equal probability), but you do not know which it is. You randomly draw a marble and observe that it is red. What is the probability that the bag you selected from is C? That is, find $P(C \mid \text{red})$. Round your answer to two decimal places.

0.45

Correct Response

This is $\frac{P(\text{red}|C) \cdot P(C)}{P(\text{red})} = \frac{1(1/3)}{2/5(1/3) + 5/6(1/3) + 1(1/3)}$.

