✓ **Congratulations! You passed!**

TO PASS 75% or higher

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Lesson 2

LATEST SUBMISSION GRADE

100%

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.

1 / 1 point

	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.

0.15

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

2. Titanic:

1 / 1 point

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

0.32

✓ **Correct**
This is (203 + 118 + 178 + 212) / 2201. This is also P(survived) = P(1st class and survived) + P(2nd class and survived) + P(3rd class and survived) + P(crew and survived).

3. Titanic:

1 / 1 point

- 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**
This is 203 / (203 + 122). If we divide the numerator and denominator by 2201, this is also P(survived | 1st class) = P(1st class and survived) / P(1st class).

4. Titanic:

1 / 1 point

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

○ True

○ False

✓ **Correct**

Note that P(survived | 1st class) is not equal to P(survived). Another way to check is to see if P(survived and 1st class)=P(survived) * P(1st class).

5. **For Questions 5-9, consider the following scenario:**   `1 / 1 point`

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**

6. Marbles: `1 / 1 point`

- 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
$P(\text{blue}) = P(\text{blue} \cap A) + P(\text{blue} \cap B) + P(\text{blue} \cap C)$
$= P(\text{blue} \mid A) \cdot P(A) + P(\text{blue} \mid B) \cdot P(B) + P(\text{blue} \mid C) \cdot P(C)$

0.26

✓ **Correct**

This is $P(\text{blue}) = P(\text{blue} \cap A) + P(\text{blue} \cap B) + P(\text{blue} \cap C)$
$= P(\text{blue} \mid A) \cdot P(A) + P(\text{blue} \mid B) \cdot P(B) + P(\text{blue} \mid C) \cdot P(C)$
$= 3/5(1/3) + 1/6(1/3) + 0(1/3) = 1/5 + 1/18$

7. Marbles: `1 / 1 point`

- 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 $P(A \mid \text{blue})$. Round your answer to two decimal places.

0.78

✓ **Correct**

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

8. Marbles: `1 / 1 point`

- 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**

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.

9. 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**

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