Practice Assignment: Probabilities of Two Events

1) In 1912, the *Titanic* struck an iceberg and sank. Some passengers survived and got off the ship in lifeboats, but many passengers died. The following table gives information about adult passengers who survived and those that did not.[1]

		Survived		
		Yes	No	**Total**
Passengers	Children/Females	373	161	**534**
	Males	338	1,329	**1,667**
	Total	**711**	**1,490**	**2,201**

Part A: What is the probability that a randomly selected passenger survived the *Titanic*? Round to the nearest thousandth.

Answer: 711/2,201 ≈ 0.323

Part B: Find the probability that a randomly selected passenger survived the *Titanic* and was a child/female. Round to the nearest thousandth.

Answer: 373/2,201 ≈ 0.169

Part C: Find the probability that a randomly selected passenger was a male and did not survive the *Titanic*. Round to the nearest thousandth.

Answer: 1,329/2,201 ≈ 0.604

Part D: Find the probability that a randomly selected passenger was a male and did survive the *Titanic*. Round to the nearest thousandth.

Answer: 338/2,201 ≈ 0.154

Part E: Find the probability that a randomly selected passenger did not survive or was male. Round to the nearest thousandth.

[1] *Titanic Survivors*. (2018). Kaggle. Retrieved from https://www.kaggle.com/c/titanic-survivors.

Answer: 1,490/2,201 + 1,667/2,201 – 1,329/2,201 = 1,828/2,201 ≈ 0.831

2) A total of 1,814 Americans were given a survey asking them to describe their happiness and income. The results are as follows:
   - 21 survey respondents described their income as “Above Average” and their happiness as “Not Happy.”
   - 96 survey respondents described their income as “Average” and their happiness as “Not Happy.”
   - 143 survey respondents described their income as “Below Average” and their happiness as “Not Happy.”
   - 213 survey respondents described their income as “Above Average” and their happiness as “Pretty Happy.”
   - 506 survey respondents described their income as “Average” and their happiness as “Pretty Happy.”
   - 347 survey respondents described their income as “Below Average” and their happiness as “Pretty Happy.”
   - 126 survey respondents described their income as “Above Average” and their happiness as “Very Happy.”
   - 248 survey respondents described their income as “Average” and their happiness as “Very Happy.”
   - 114 survey respondents described their income as “Below Average” and their happiness as “Very Happy.”

   Part A: Complete the following table, including the total values, using the results described above.

		Happiness			
		Not Happy	Pretty Happy	Very Happy	**Total**
Income	Above Average	21	213	126	**360**
	Average	96	506	248	**850**
	Below Average	143	347	114	**604**
	Total	**260**	**1,066**	**488**	**1,814**

Answer: Noted above in red.

Part B: Find the probability that a randomly selected person is not happy and has an above average income. Round to the nearest thousandth.

Answer: 21/1,814 ≈ 0.012

Part C: Find the probability that a randomly selected person is very happy or has an above average income. Round to the nearest thousandth.

Answer: 488/1,814 + 360/1,814 – 126/1,814 = 722/1,814 ≈ 0.398

Part D: Find the probability that a randomly selected person does NOT have a below average income and is NOT very happy. Round to the nearest thousandth.

Answer: 836/1,814 ≈ 0.461

Part E: Are the event “Very Happy” and the event “Below Average” income mutually exclusive? Explain.

Answer: No, since a person can feel very happy and have a below average income.