Review Test Submission: MBC638 Quiz #8 - Probability (due Sunday, Oct. 28, 10:00pm)

User	David Forteguerre
Course	MBC.638.M001.FALL18.Data Anls & Decisn Making
Test	MBC638 Quiz #8 - Probability (due Sunday, Oct. 28, 10:00pm)
Started	10/28/18 2:17 PM
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Status	Completed
Attempt Score	110 out of 100 points
Time Elapsed	24 minutes out of 1 hour
Results Displayed	All Answers, Submitted Answers, Correct Answers, Feedback, Incorrectly Answered Questions

Question 1

15 out of 15 points

Laid-off workers who become entrepreneurs because they cannot find meaningful employment with another company are known as entrepreneurs by necessity. *The Wall Street Journal* reports that these entrepreneurs by necessity are less likely to grow into large businesses than are entrepreneurs by choice (J. Bailey, "Desire – More Than Need – Builds a Business," *The Wall Street Journal*, May 21, 2001).

This article states that **10%** of the entrepreneurs in the United States are **entrepreneurs by necessity** and the remaining are **entrepreneurs by choice**. Only **1%** of entrepreneurs by necessity expect their new business to employ 20 or more people within 5 years, whereas **12%** of entrepreneurs by choice expect to employ at least 20 people within 5 years.

a) Mr. Gupta is a new entrepreneur who has just received his MBA degree. He predicts that his new "iPods and uPods" business will employ 20 or more people within five years. **Based on this information, what is the probability that Mr. Gupta is an entrepreneur by choice?**

Enter your answer in the space below in decimal form, NOT in % form. Round your answer to 4 decimal places. For example, if your computed probability is 12.34%, then write 0.1234.

b) Are expectations regarding employing new people within the first few years of starting a new business dependent or independent from the type of an entrepreneur? You are **not** required to provide your answer here. However, think about your answer and how you would explain it.

Selected Answer: 0.9908

Correct Answer: 0.9908 ± 0.05

Response Feedback:

Question 2

20 out of 20 points

The records of the credit card department of Macy's in NYC shows that **30 percent of their sales are cash or check**, **30 percent are paid with a credit card**, and **40 percent with a debit card**. **Twenty percent of the cash or check purchases, 90 percent of the credit card purchases, and 60 percent of the debit card purchases are for more than $50.**

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The form of payment is an important tool that supermarkets can use to target certain customers and to get them to pay even more. For example, if customers that pay with a credit card tend to make larger purchases, then the supermarket's marketing department might consider sending out promotional credit card offers to the homes of those customers who pay with a debit card or with cash, in order to get them to pay more next time.

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a) Based on the information given above, of all purchases at Macy's, what proportion are for under $50? (Your answer should be in decimal form, rounded to 2 decimal places) **0 . [a][b]**

b) Aditya went to NYC to interview with Google. Before the interview, he stopped by Macy's to buy a suit that cost $380.

- What is the least likely method that he has used to pay for the suit? **[c]**
- What is the probability that Aditya paid using this method? (Your probability should be in decimal form, rounded to 2 decimal places) **0 . [d][e]**

c) Yimin went to NYC to visit the Statue of Liberty. While in NYC, she stopped by Macy's and bought a pair of boots for $45.

- What is the probability that Yimin has paid with a credit card? (Your probability should be in decimal form, rounded to 2 decimal places) **0 . [f][g]**

Selected Answer:

The records of the credit card department of Macy's in NYC shows that **30 percent of their sales are cash or check**, **30 percent are paid with a credit card**, and **40 percent with a debit card**. **Twenty percent of the cash or check purchases, 90 percent of the credit card purchases, and 60 percent of the debit card purchases are for more than $50.**

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a) Based on the information given above, of all purchases at Macy's, what proportion are for under $50? (Your answer should be in decimal form, rounded to 2 decimal places) **0 . 4 3**

b) Aditya went to NYC to interview with Google. Before the interview, he stopped by Macy's to buy a suit that cost $380.

- What is the least likely method that he has used to pay for the suit? **Cash**
- What is the probability that Aditya paid using this method? (Your probability should be in decimal form, rounded to 2 decimal places) **0 . 1 1**

c) Yimin went to NYC to visit the Statue of Liberty. While in NYC, she stopped by Macy's and bought a pair of boots for $45.

- What is the probability that Yimin has paid with a credit card? (Your probability should be in decimal form, rounded to 2 decimal places) **0 . 0 7**

Answers:

The records of the credit card department of Macy's in NYC shows that **30 percent of their sales are cash or check**, **30 percent are paid with a credit card**, and **40 percent with a debit card**. **Twenty percent of the cash or check purchases, 90 percent of the credit card purchases, and 60 percent of the debit card purchases are for more than $50.**

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- What is the probability that Yimin has paid with a credit card? (Your probability should be in decimal form, rounded to 2 decimal places) **0 . 0 7**

All Answer Choices

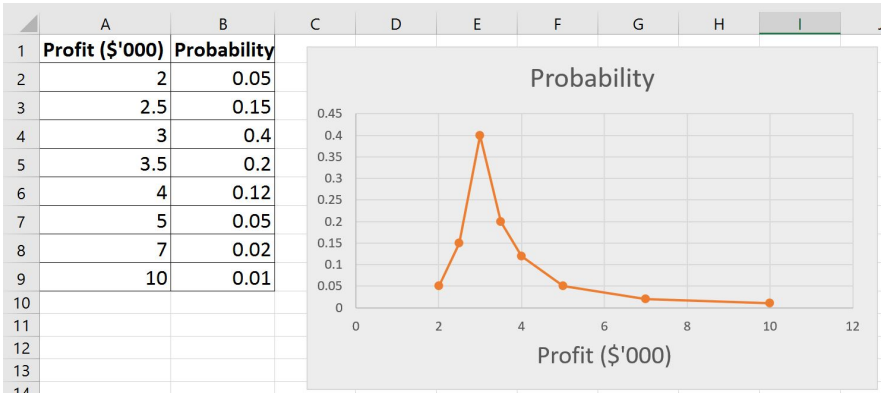
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- Cash
- Credit
- Debit

Response Feedback:

Question 3 10 out of 10 points

The following snapshot of Excel spreadsheet shows the probability model for a company's **weekly profit** (in thousands

of dollars) along with the illustration of the probability distribution.



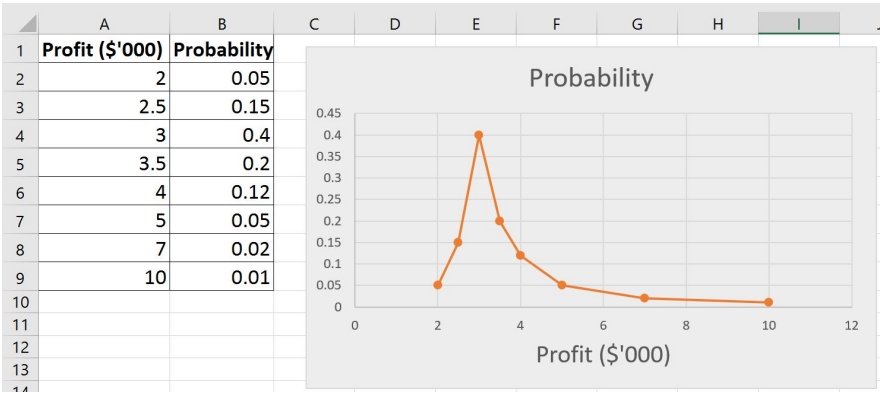
Profit ($'000)	Probability
2	0.05
2.5	0.15
3	0.4
3.5	0.2
4	0.12
5	0.05
7	0.02
10	0.01

Let's call random variable **X = Profit**. Then:

a) P(X ≥ 5) = **[a]**

b) P(X < 3) = **[b]**

Selected Answer: The following snapshot of Excel spreadsheet shows the probability model for a company's **weekly profit** (in thousands of dollars) along with the illustration of the probability distribution.



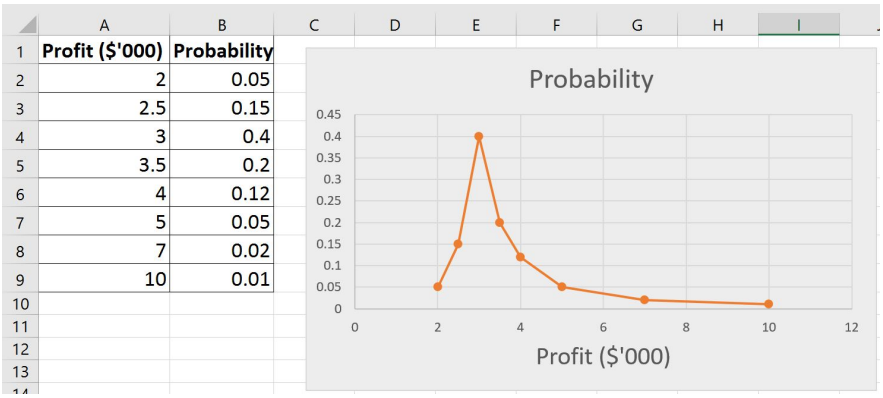
Profit ($'000)	Probability
2	0.05
2.5	0.15
3	0.4
3.5	0.2
4	0.12
5	0.05
7	0.02
10	0.01

Let's call random variable **X = Profit**. Then:

a) P(X ≥ 5) = **0.08**

b) P(X < 3) = **0.2**

Answers: The following snapshot of Excel spreadsheet shows the probability model for a company's **weekly profit** (in thousands of dollars) along with the illustration of the probability distribution.



Profit ($'000)	Probability
2	0.05
2.5	0.15
3	0.4
3.5	0.2
4	0.12
5	0.05
7	0.02
10	0.01

Let's call random variable **X = Profit**. Then:

a) P(X ≥ 5) = **0.08**

b) P(X < 3) = **0.2**

All Answer Choices

- 0.02
- 0.03
- 0.08
- 0.2
- 0.4
- 0.6

Response Feedback:

Question 4

10 out of 10 points

The GEICO Automobile Insurance Company is the second largest U.S. auto insurer after State Farm, and is a subsidiary of Berkshire Hathaway.

You are working in the claims department of GEICO and are directly responsible for figuring out how much each policyholder has to pay in premium on collision insurance. Of course, if the premium is set too high then no one would want to buy coverage from GEICO, but if the premium is set too low then GEICO might go bankrupt!

How do insurance companies calculate how much premium you have to pay? What they do is, they split all policyholders into pools (or buckets) by different characteristics (such as your age, your driving history, your car type, how often and how far you drive, the city you live in, etc.). Then, for each pool, collision insurance **premium** is determined based on the **expected collision payment**.

The **probability distribution** for annual damage claim payments (per policyholder) made by GEICO to policyholders on collision insurance is as follows (the numbers are not real; the real distribution is continuous rather than discrete):

Payment ($)	Probability
0	0.798
500	0.083
1,000	0.036
3,000	0.027
5,000	0.023
8,000	0.015
10,000	0.018

Calculate the insurance premium ($) that a policyholder needs to pay to GEICO annually on collision insurance.

Selected Answer: 573.5

Correct Answer: 573.500 ± 1

Response Feedback:

Question 5

20 out of 20 points

An auto insurance policy costs $100 (premium) a month and will pay the car owner $20,000 if he suffers a major injury as a result of a car accident or $4,000 if he suffers a minor injury. The insurance company estimates that each month 1 in every 3,000 policyholders may have a major injury, and 1 in 400 a minor injury.

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For the following questions (a, b, and c), please perform all calculations in Excel. This way, you will avoid losing points due to rounding errors.

a) Create a probability model for the **monthly profit** on a policy, from the point of view of the insurance company. In the table below, enter the values of X and the corresponding probabilities (4 decimal places). **X = insurance company's profit**.

	X	P(X)
No injury	**$[a][b][c]**	**0.[i][j][k][l]**
Minor injury	**-$3,900**	**0.00[m][n]**
Major injury	**-$[d][e],[f][g][h]**	**0.00[t][u]**

b) What is the insurance company's **expected profit** on this policy? Round to the closest whole number. **$[o][p]**

c) What is the **standard deviation**? Round to the closest whole number. **$[q][r][s]**

Selected Answer:

An auto insurance policy costs $100 (premium) a month and will pay the car owner $20,000 if he suffers a major injury as a result of a car accident or $4,000 if he suffers a minor injury. The insurance company estimates that each month 1 in every 3,000 policyholders may have a major injury, and 1 in 400 a minor injury.

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	X	P(X)
No injury	**$ 1 0 0**	**0. 9 9 7 2**
Minor injury	**-$3,900**	**0.00 2 5**
Major injury	**-$ 1 9, 9 0 0**	**0.00 0 3**

b) What is the insurance company's **expected profit** on this policy? Round to the closest whole number. **$ 8 3**

c) What is the **standard deviation**? Round to the closest whole number. **$ 4 1 6**

Answers:

An auto insurance policy costs $100 (premium) a month and will pay the car owner $20,000 if he suffers a major injury as a result of a car accident or $4,000 if he suffers a minor injury. The insurance company estimates that each month 1 in every 3,000 policyholders may have a major injury, and 1 in 400 a minor injury.

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	X	P(X)
No injury	**$ 1 0 0**	**0. 9 9 7 2**
Minor injury	**-$3,900**	**0.00 2 5**
Major injury	**-$ 1 9, 9 0 0**	**0.00 0 3**

b) What is the insurance company's **expected profit** on this policy? Round to the closest whole number. **$ 8 3**

c) What is the **standard deviation**? Round to the closest whole number. **$ 4 1 6**

All Answer Choices

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Response Feedback:

Question 6

25 out of 25 points

In a lottery conducted to benefit a local charity, 10,000 tickets are to be sold at $45 each. The prize is $1 million. There are two winning tickets ($1 million each). **You purchase 2 tickets.** What is your **expected gain**?

In the space below, write your answer as a whole number. Skip the $ symbol. For example, if your answer is $123, then write 123.

Selected Answer: 310
Correct Answer: 310
Response Feedback:

Question 7

10 out of 10 points (Extra Credit)

THIS IS A BONUS QUESTION WORTH 10 POINTS. YOU CAN GET 100 POINTS ON THIS QUIZ WITHOUT HAVING TO SOLVE THIS PROBLEM. BUT IF YOU ENJOY PROBABILITY AND WANT SOME CHALLENGE, THEN HERE IS AN INTERESTING APPLICATION. Your quiz grade will be capped at 100 points even if your actual score exceeds 100.

A business manager who needs to make many phone calls knows from experience that, when she calls a client, there is a **60%** chance of reaching the client right away. If she does not reach the client on the first call, the probability that she will reach a client with a subsequent (second) call in the next hour is **20%**.

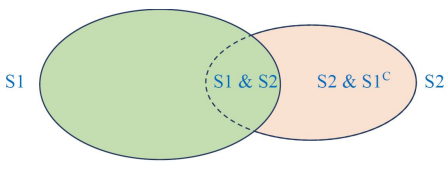
a) Find the probability that the manager reaches her client in two or fewer calls. Your answer should be in decimal form, rounded to 2 decimal places. **[a]**

b) Find the probability that the manager reaches her client on the second call but not on the first call. (Hint: here, "but" should be interpreted as "and." Don't you just love probability?!) Your answer should be in decimal form, rounded to 2 decimal places. **[b]**

c) Find the probability that the manager is unsuccessful on two consecutive calls. Your answer should be in decimal form, rounded to 2 decimal places. **[c]**

You can use the following definitions and venn diagrams to think about this problem:

S1 = {Successful in reaching client in 1 call}
S2 = {Successful in reaching client on 2nd call}



Specified Answer for: a 0.68

Specified Answer for: b 0.08

Specified Answer for: c 0.32

Correct Answers for: a		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
Contains	.68	
Correct Answers for: b		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
Contains	.08	
Correct Answers for: c		
Evaluation Method	**Correct Answer**	**Case Sensitivity**
Contains	.32	

Response Feedback:

Wednesday, November 21, 2018 1:15:53 PM EST

← OK