



Review Test Submission: MBC638 Quiz #9 - Probability, Normal, CLT (due Sunday, Nov. 4, 10:00pm)

User	David Forteguerre
Course	MBC.638.M001.FALL18.Data Anls & Decisn Making
Test	MBC638 Quiz #9 - Probability, Normal, CLT (due Sunday, Nov. 4, 10:00pm)
Started	11/4/18 3:22 PM
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Status	Completed
Attempt Score	100 out of 100 points
Time Elapsed	51 minutes out of 1 hour and 30 minutes
Results Displayed	All Answers, Submitted Answers, Correct Answers, Feedback, Incorrectly Answered Questions

Question 1

5 out of 5 points



The demands for a company's product in quarters 1, 2, 3, and 4 have a mean of 50 thousand tons and a standard deviation of 10 tons. Let's call **quarterly** demand **X**. Let's call **annual** demand **Y**. Express **Y** in terms of **X**:

Selected Answer:
$$Y = X_1 + X_2 + X_3 + X_4$$

Answers:
$$Y = X_1 + X_2 + X_3 + X_4$$

Can't answer this question because we don't know the correlation between the quarterly demands

$Y = 4*X$

$Y = 50*4 X$

Response Feedback:

Question 2

10 out of 10 points





Please see example on Lecture 08, slide 25. Here are the complete solutions to this problem. Based on this problem, answer the following questions. Please perform all calculations in Excel so that you don't lose points due to rounding errors.

Recently, the financial services salesperson won the "best salesperson of the year" award. As a result, she expects that in the next year she will receive **an additional bonus of \$10,000** on top of her salary.

- a) What **annual salary** can this salesperson **expect** to earn in the next year ? **\$[a][b],000.**
- b) Assuming that her sales commissions in different months are independent random variables, what is the **standard deviation** of her **annual salary** in the next year ? **Round to 2 decimal places. \$[d],[e][f][g].87.**

Selected Answer:



Please see example on Lecture 08, slide 25. Here are the complete solutions to this problem. Based on this problem, answer the following questions. Please perform all calculations in Excel so that you don't lose points due to rounding errors.

Recently, the financial services salesperson won the "best salesperson of the year" award. As a result, she expects that in the next year she will receive **an additional bonus of \$10,000** on top of her salary.

- a) What **annual salary** can this salesperson **expect** to earn in the next year ? **\$ 9 5,000.**
- b) Assuming that her sales commissions in different months are independent random variables, what is the **standard deviation** of her **annual salary** in the

next year ? Round to 2 decimal places. \$ 2, 4 2 4.87.

Answers:



Please see example on Lecture 08, slide 25. Here are the complete solutions to this problem. Based on this problem, answer the following questions. Please perform all calculations in Excel so that you don't lose points due to rounding errors.

Recently, the financial services salesperson won the "best salesperson of the year" award. As a result, she expects that in the next year she will receive **an additional bonus of \$10,000** on top of her salary.

- a) What **annual salary** can this salesperson **expect** to earn in the next year ? \$ **5,000.**
- b) Assuming that her sales commissions in different months are independent random variables, what is the **standard deviation** of her **annual salary** in the next year ? Round to 2 decimal places. \$ 2, 4 2 4.87.

All Answer Choices

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

Response Feedback:

Question 3

15 out of 15 points



You are a risk-averse investor and plan to invest a total of \$10,000 in Starbucks and Dunkin' Donuts in equal proportions. Starbucks' expected return next year is 8.9% with a standard deviation of 2.2%. Dunkin' Donuts' expected return next year is 14.2% with a standard deviation of 2.5%. Because the two companies are operating in a very similar industry, the correlation coefficient between the two companies' returns is 0.41.

- a) In the box below, compute and write down the value of the portfolio return's **standard deviation**.

Your answer should be in decimal form, rounded to 6 decimal places. Hints:

- o Don't accidentally write down the value of variance.
- o You are given the value of the correlation coefficient, not covariance.
- o Convert the given expected returns and standard deviations into decimal form before doing calculations.

- b) Although this problem doesn't ask you to do so, also think how you would answer the following question: Is there a risk-reducing benefit of diversification for this portfolio? Compute by how much the risk (i.e., standard deviation) of your portfolio return is **increased** (because of positive correlation) compared to the case in which the two companies' stocks' returns are **uncorrelated**.

Selected Answer:  0.019748

Correct Answer:  0.019748 ± 0.002

Response Feedback: 

Question 4

15 out of 15 points



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

--	--

		Mr. Brick		
		0	1	2
Mr. Wood	0	0.11	0.41	0.07
	1	0.20	0.05	0.03
	2	0.08	0.03	0.02

- a) On average, how many houses does Mr. Brick sell in one month? [a] What is the variance? [b]
- b) On average, how many houses does Mr. Wood sell in one month? [c] What is the variance? [d]
- c) The manager of the Westcott real estate office is examining the total number of houses that it sells in a month. For this variable, complete the following probability table:

# Houses sold total (monthly)	0	1	2	3	4
Probability	[f]	[g]	[h]	[i]	[j]

On average, how many houses do Mr. Brick and Mr. Wood sell monthly together? [k]

Selected Answer:



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

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		0	1	2
Mr. Wood	0	0.11	0.41	0.07
	1	0.20	0.05	0.03
	2	0.08	0.03	0.02

- a) On average, how many houses does Mr. Brick sell in one month? ✓ **0.73**
What is the variance? ✓ **0.4371**
- b) On average, how many houses does Mr. Wood sell in one month? ✓ **0.54**
What is the variance? ✓ **0.5084**

- c) The manager of the Westcott real estate office is examining the total number of houses that it sells in a month. For this variable, complete the following probability table:

# Houses sold total (monthly)	0	1	2	3	4
Probability	✓ 0.11	✓ 0.61	✓ 0.20	✓ 0.06	✓ 0.02

On average, how many houses do Mr. Brick and Mr. Wood sell monthly together? ✓ 1.27

Answers:



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

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		0	1	2
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	2	0.08	0.03	0.02

a) On average, how many houses does Mr. Brick sell in one month? ✓ 0.73
What is the variance? ✓ 0.4371

b) On average, how many houses does Mr. Wood sell in one month? ✓ 0.54
What is the variance? ✓ 0.5084

- c) The manager of the Westcott real estate office is examining the total number of houses that it sells in a month. For this variable, complete the following probability table:

# Houses sold total (monthly)	0	1	2	3	4
Probability	✓ 0.11	✓ 0.61	✓ 0.20	✓ 0.06	✓ 0.02

On average, how many houses do Mr. Brick and Mr. Wood sell monthly together? ✓ 1.27

All Answer Choices

- 0
- -0.3059
- -0.1442
- 1.27
- 0.6571
- 0.54
- 0.73
- 0.02
- 0.06
- 0.08
- 0.11
- 0.20
- 0.61
- 0.5084
- 0.4371

Response Feedback: 😊

Question 5

15 out of 15 points



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

		Mr. Brick		
		0	1	2
Mr. Wood	0	0.11	0.41	0.07
	1	0.20	0.05	0.03
	2	0.08	0.03	0.02

- a) What is the covariance between the numbers of houses sold by Mr. Brick and Mr. Wood? **[a]**
- b) What is the correlation coefficient between the numbers of houses sold by Mr. Brick and Mr. Wood? **[b]**

Selected Answer:



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

		Mr. Brick		
		0	1	2
Mr. Wood	0	0.11	0.41	0.07
	1	0.20	0.05	0.03
	2	0.08	0.03	0.02

a) What is the covariance between the numbers of houses sold by Mr. Brick and Mr. Wood? **-0.1442**

b) What is the correlation coefficient between the numbers of houses sold by Mr. Brick and Mr. Wood? **-0.3059**

Answers:



Century 21 is a large real estate firm. Its local office in the Westcott neighborhood has two agents: Mr. Brick and Mr. Wood. Based on the past 5-year history, there is a 11% chance that neither of them will sell a house in any given month, 41% chance that Mr. Brick will sell one house while Mr. Wood will sell none, 20% chance that Mr. Wood will sell one house while Mr. Brick will sell none, and so on. There's never been a month when either agent would sell more than 2 houses. The complete probability distribution is shown in the table below.

		Mr. Brick		
		0	1	2
Mr. Wood	0	0.11	0.41	0.07
	1	0.20	0.05	0.03
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- a) What is the covariance between the numbers of houses sold by Mr. Brick and Mr. Wood? **-0.1442**
- b) What is the correlation coefficient between the numbers of houses sold by Mr. Brick and Mr. Wood? **-0.3059**

All Answer Choices

- 0
- -0.3059
- -0.1442
- 1.27
- 0.6571
- 0.54
- 0.73
- 0.02
- 0.06
- 0.08
- 0.11
- 0.20
- 0.61
- -0.5084
- -0.4371

Response Feedback:

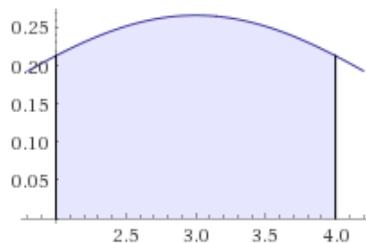
Question 6

5 out of 5 points



Suppose a random variable X follows a **Normal distribution** with $\mu = 3$ and $\sigma = 1.5$.

What is the probability **P(2 < X < 4)** ?



Round your answer to 4 decimal places. Your answer should be in decimal form, e.g., 0.1234.

Selected Answer: 0.4950

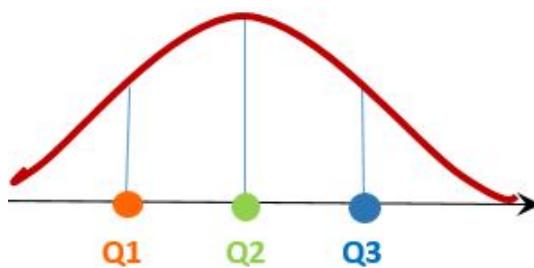
Correct Answer: 0.495

Answer range +/- 0.0005 (0.49450 - 0.49550)

Response Feedback:

Question 7

5 out of 5 points



Calculate the first **3 quartiles** of the Normal distribution with $\mu = 3$ and $\sigma = 22$.

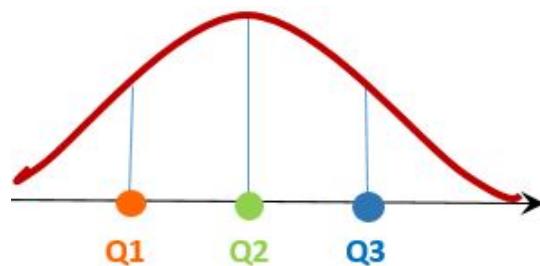
First quartile = [a][aa] + [b][c][d][e]

Second quartile = [g] + [h][i][l][j]

Third quartile = [k][l] + [m][n][o][p]

Round your answers to 4 decimal places.

Selected Answer:



Calculate the first **3 quartiles** of the Normal distribution with $\mu = 3$ and $\sigma = 22$.

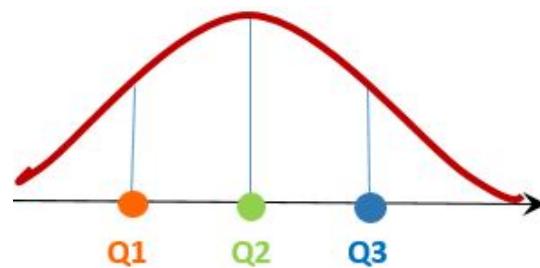
First quartile = 1 1 + 8 3 8

Second quartile = 3 + 0 0 0

Third quartile = 1 7 + 8 3 8

Round your answers to 4 decimal places.

Answers:



Calculate the first **3 quartiles** of the Normal distribution with $\mu = 3$ and $\sigma = 22$.

First quartile = 1 1 8 8 3 8 8

Second quartile = 3 0 0 0 0

Third quartile = 1 7 8 3 8 8

Round your answers to 4 decimal places.

All Answer Choices

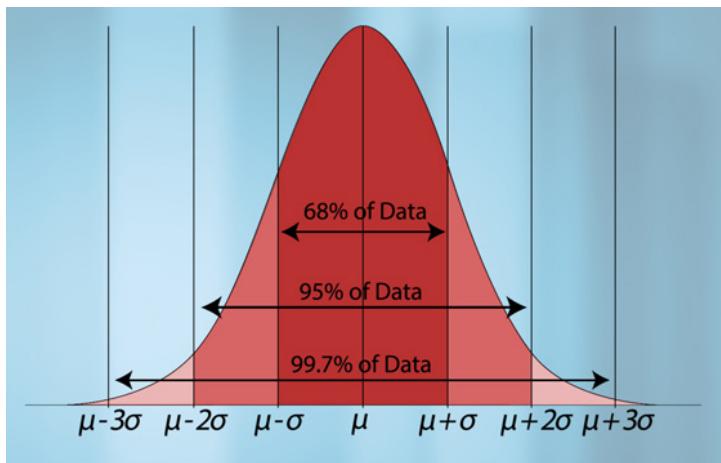
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Response Feedback:

Question 8

10 out of 10 points



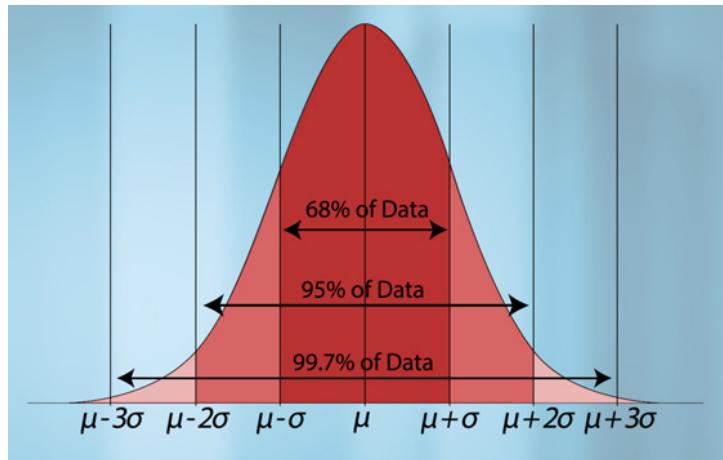


The Empirical Rule says that, for bell-shaped symmetric distributions, **approximately 68% of the data fall within one standard deviation away from the mean**. Where is this number 68% coming from? For a random variable X that follows the Normal distribution with **any μ** and **any σ** , compute the probability that X falls within 1 standard deviation away from the mean.

Probability = 0.68[a][b][c][d][e]

Round to 7 decimal places.

Selected Answer:

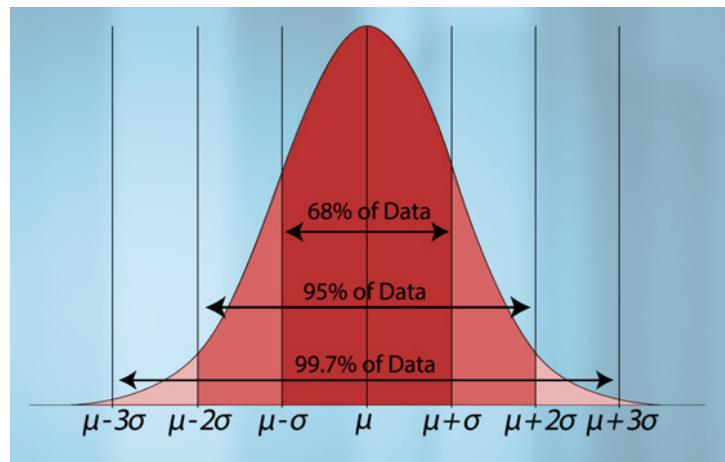


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Probability = 0.68 2 6 8 9 5

Round to 7 decimal places.

Answers:



The Empirical Rule says that, for bell-shaped symmetric distributions, approximately 68% of the data fall within one standard deviation away from the mean. Where is this number 68% coming from? For a random variable X that follows the Normal distribution with **any** μ and **any** σ , compute the probability that X falls within 1 standard deviation away from the mean.

Probability = 0.68 2 6 8 9 5

Round to 7 decimal places.

All Answer Choices

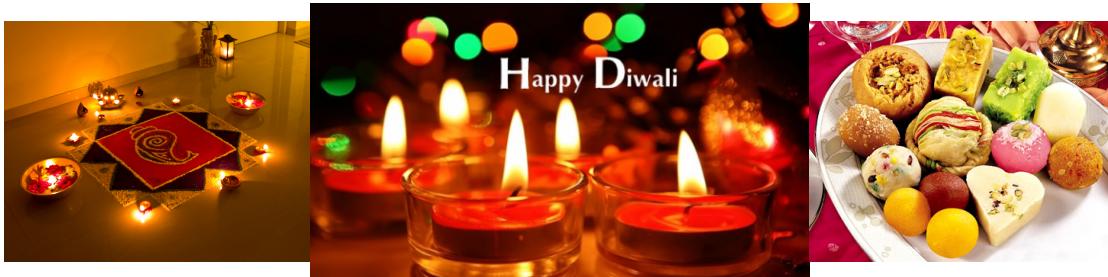
- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9

Response Feedback:

Question 9

15 out of 15 points





Diwali is the Hindu festival of lights celebrated every year in fall. In 2018, it will be celebrated on November 7. It signifies the victory of light over darkness, good over evil, knowledge over ignorance, and hope over despair. Its celebration includes millions of lights shining on housetops, outside doors and windows, around temples and other buildings. (Source: Wikipedia)

Diwali also marks a major shopping period (similar to Christmas time). A major coffee shop in New Delhi called "Indian Coffee House" sells traditional desserts. They see a spike in customers around Diwali. Indian Coffee House has been in business for over 30 years and they have been collecting data on the sales of their desserts ever since.

On a typical day around the Diwali celebration, Indian Coffee House has observed the demand for **sooji halwa** (traditional dessert) to be Normally distributed with **mean 313** items sold in one day with **standard deviation of 57**. Then, the demand for **jalebi** (another traditional dessert) is Normally distributed with **mean 93** and **standard deviation 22**.

To answer the following questions, please perform all calculations in Excel.

- How many **sooji halwa** should Indian Coffee House stock to be **98%** sure of not running out on a given day? **Round to the closest whole number.** [a]
- How many **jalebi** should Indian Coffee House stock to be **98%** sure of not running out on a given day? **Round to the closest whole number.** [b]
- Indian Coffee House stocks **400 sooji halwa** and **150 jalebi** on a given day right before Diwali. Then, what is the probability that the coffee shop will either run out of sooji halwa or run out of jalebi or both on that day? Assume that the demands for sooji halwa and jalebi are probabilistically independent; it means that if you observe one of them, it doesn't help you to predict the other. **Round to 5 decimal places.** [c]

Selected
Answer:





Diwali is the Hindu festival of lights celebrated every year in fall. In 2018, it will be celebrated on November 7. It signifies the victory of light over darkness, good over evil, knowledge over ignorance, and hope over despair. Its celebration includes millions of lights shining on housetops, outside doors and windows, around temples and other buildings. (Source: Wikipedia)

Diwali also marks a major shopping period (similar to Christmas time). A major coffee shop in New Delhi called "Indian Coffee House" sells traditional desserts. They see a spike in customers around Diwali. Indian Coffee House has been in business for over 30 years and they have been collecting data on the sales of their desserts ever since.

On a typical day around the Diwali celebration, Indian Coffee House has observed the demand for **sooji halwa** (traditional dessert) to be Normally distributed with **mean 313** items sold in one day with **standard deviation of 57**. Then, the demand for **jalebi** (another traditional dessert) is Normally distributed with **mean 93** and **standard deviation 22**.

To answer the following questions, please perform all calculations in Excel.

- How many **sooji halwa** should Indian Coffee House stock to be **98%** sure of not running out on a given day? **Round to the closest whole number.** 430
- How many **jalebi** should Indian Coffee House stock to be **98%** sure of not running out on a given day? **Round to the closest whole number.** 138
- Indian Coffee House stocks **400 sooji halwa** and **150 jalebi** on a given day right before Diwali. Then, what is the probability that the coffee shop will either run out of sooji halwa or run out of jalebi or both on that day? Assume that the demands for sooji halwa and jalebi are probabilistically independent; it means that if you observe one of them, it doesn't help you to predict the other. **Round to 5 decimal places.** 0.06795

Answers:





Diwali is the Hindu festival of lights celebrated every year in fall. In 2018, it will be celebrated on November 7. It signifies the victory of light over darkness, good over evil, knowledge over ignorance, and hope over despair. Its celebration includes millions of lights shining on housetops, outside doors and windows, around temples and other buildings. (Source: Wikipedia)

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To answer the following questions, please perform all calculations in Excel.

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- How many **jalebi** should Indian Coffee House stock to be **98%** sure of not running out on a given day? **Round to the closest whole number.** 138
- Indian Coffee House stocks **400 sooji halwa** and **150 jalebi** on a given day right before Diwali. Then, what is the probability that the coffee shop will either run out of sooji halwa or run out of jalebi or both on that day? Assume that the demands for sooji halwa and jalebi are probabilistically independent; it means that if you observe one of them, it doesn't help you to predict the other. **Round to 5 decimal places.** 0.06795

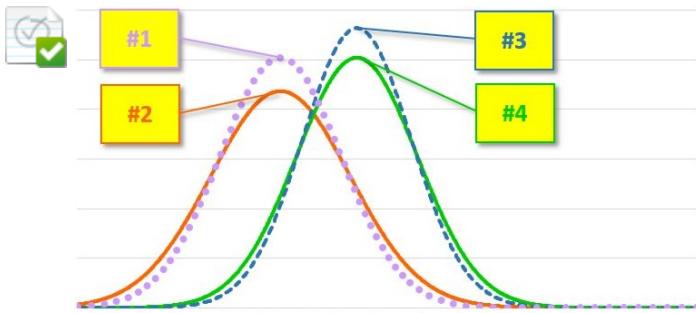
All Answer Choices

- 48
- 138
- 250
- 196
- 68
- 430
- 0.06825
- 0.06795
- 0.99970

Response Feedback:

Question 10

5 out of 5 points



Each of the illustrated distributions portrays the distribution of the **sample mean** based on samples of size n . The four distributions are listed in the multiple choice list below (in no particular order). Which of the 4 distributions does **#1** refer to?

Selected Answer: $\mu = 53, \sigma = 10, n = 40$

Answers:

- $\mu = 53, \sigma = 10, n = 30$
- $\mu = 55, \sigma = 10, n = 40$
- $\mu = 55, \sigma = 10, n = 50$
- $\mu = 53, \sigma = 10, n = 40$

Response Feedback: 😊

Wednesday, November 21, 2018 1:16:28 PM EST

← OK