

## 2024 CB-RAT Grade 12 Mathematics

INSTRUCTIONS: SHADE the letter of the correct answer on the provided answer sheet.

1. **ROAD TRIP**

Sarah is planning a road trip from City A to City B. She knows that the cost of fuel  $C$ , in pesos, is a function of the distance travelled,  $d$ , in miles and can be expressed as  $C(d) = 25d + 35$ . If Sarah plans to drive 45 miles, what will be the total cost of fuel for her trip?

- a. Php 1,100.00
- b. Php 1,100.00
- c. Php 1,260.00
- d. Php 1,265.00

2. **ROAD TRIP**

Determine the distance Sarah can travel if she has Php 1,000.00 budgeted for fuel.

- a. 35.6 miles
- b. 37.6 miles
- c. 38.6 miles
- d. 39.6 miles

3. Evaluate the function  $f(x) = 3x^2 - 3x + 5$ , given  $x = 2x + 3$ .

- a.  $12x^2 + 30x + 23$
- b.  $12x^2 + 30x + 25$
- c.  $12x^2 + 30x + 26$
- d.  $12x^2 + 30x + 28$

4. Given  $h(x) = \frac{(2x^2-5)}{3}$ , determine  $h(4)$ .

- a.  $25/3$
- b.  $26/3$
- c.  $27/3$
- d.  $28/3$

5. The function  $C$  described by  $C(F) = \frac{5}{9}(F - 32)$  gives the Celsius temperature corresponding to the Fahrenheit temperature  $F$ . Find the Celsius temperature equivalent to  $14^\circ\text{F}$ ?

- a. -20 degree Celsius
- b. -10 degree Celsius
- c. -5 degree Celsius
- d. -2 degree Celsius

6. The function  $A$  described by  $A(s) = \frac{s^2\sqrt{3}}{4}$  gives the area of an equilateral triangle with side  $s$ . Find the area when a side measures 8 inches.

- a.  $16\sqrt{3} \text{ in}^2$
- b.  $14\sqrt{3} \text{ in}^2$
- c.  $12\sqrt{3} \text{ in}^2$
- d.  $4\sqrt{3} \text{ in}^2$

7. Which of the following is an example of rational function?

- a.  $f(x) = \sqrt{5}$
- b.  $f(x) = \frac{3x+7}{x-2}$
- c.  $(x+4) \geq \frac{x+2}{x-1}$
- d.  $\frac{x-6}{5x} = 20$

$x$	1	2	3	4
$f(x)$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{5}{6}$	$\frac{6}{7}$

8. Given the table,  
Which rational function is represented by the table?

- a.  $f(x) = \frac{x-1}{x+3}$
- b.  $f(x) = \frac{x+2}{x+3}$
- c.  $f(x) = \frac{x-3}{x+4}$
- d.  $f(x) = \frac{x+4}{x-5}$

9. Which rational function is represented by the table below?

$x$	1	2	3	4
$f(x)$	0	$\frac{3}{5}$	$\frac{4}{5}$	$\frac{15}{17}$

- a.  $f(x) = \frac{x+3}{x+5}$
- b.  $f(x) = \frac{x^2+1}{x+5}$
- c.  $f(x) = \frac{x^2-1}{x^2+1}$
- d.  $f(x) = \frac{x^2+3}{x+5}$

10. Peter claims that the  $x$  – intercepts of a rational function are the same as its zeroes. How would you respond to this statement?

- a. Agree, as  $x$ -intercepts and zeroes are synonymous in mathematical terms.
- b. Disagree, as  $x$ -intercepts and zeroes have distinct definitions.
- c. Partially agree, as they can be the same in some cases.
- d. It depends on the specific rational function being discussed.

11. You encounter a rational function with a slant asymptote. What insight does this provide into the overall behavior of the function?

- a. The function has a vertical asymptote.
- b. The function has a hole.
- c. The function approaches a linear expression as  $x$  becomes large.
- d. The function is undefined for certain values of  $x$ .

12. Consider the rational function  $p(x) = \frac{2x^2+5x-3}{x^2-1}$ . What are its vertical asymptotes?

- a.  $x = 1$  and  $x = -1$
- b.  $x = 0$
- c.  $x = -3$  and  $x = 2$
- d.  $x = 1$  and  $x = 3$

13. Determine the y – intercept of a rational function  $h(x) = \frac{x^2+9}{x^2-3}$ .

- a.  $y = 3$
- b.  $y = -3$
- c.  $y = -4$
- d.  $y = -9$

14. The number of students at Science High School has increased by 35 in each of the past five years. The population was 450 five years ago. Which of the following functions expresses the present population where P(t) represent the present population and t the time in years?

- a.  $P(t) = 450t + 35$
- b.  $P(t) = 450 + 35t$
- c.  $P(t) = \frac{t}{450} + 35$
- d.  $P(t) = 450 + \frac{t}{35}$

15. Rona pays a monthly pay of PhP600 for her membership at the fitness centre. She also pays an additional PhP150 for every session. Which of the following functions f(x) represent the average cost per session if she goes x sessions?

- a.  $f(x) = 150 + 600x$
- b.  $f(x) = 150x + 600$
- c.  $f(x) = 150 + \frac{x}{600}$
- d.  $f(x) = \frac{x}{150} + 600$

16. Which of following does NOT represent one-to-one function?

- a. My Father to its child
- b. Facebook name to password
- c. Student's Name to Learner's Reference Number
- d. Cellphone number to the owner

17. What is the missing ordered pair in the table with a  $f(x) = 2x + 9$ ?

f(x)	3	5	___	9	11
y	15	19	___	27	31

- a. (6 , 20)
- b. (7 , 22)
- c. (7 , 23)
- d. (8 , 25)

18. A study found that the relationship between the number of hours ( $x$ ) and the student's exam scores  $f(x)$  is given by the equation of function  $f(x) = 10x + 55$ . Using this information, what will be the estimated number of scores of the student if he spent 4 hours in studying?
- 95
  - 85
  - 75
  - 65
19. The relationship between temperatures in degree Celsius ( $^{\circ}C$ ) and in degree Fahrenheit ( $^{\circ}F$ ) is given by  $^{\circ}C = 5/9(^{\circ}F - 32)$ . What is the corresponding value in degree Fahrenheit of  $37.78^{\circ}C$ ?
- $80^{\circ}F$
  - $90^{\circ}F$
  - $100^{\circ}F$
  - $110^{\circ}F$

20. **WEDDING**

Cath and Arvin are planning for their wedding. Cath suggested that she wants Casa de Aurora to cater their reception. The reception hall rental fee starts at a flat rate of ₱3,500.00 and an additional rental fee of ₱60.00 per guest. If their budget is limited at ₱20,000.00. What is the domain and range of the inverse?

- $D = \{x \in \mathbb{N} \mid 0 \leq x \leq 275\}$
- $R = \{y \in \mathbb{R} \mid 0 \leq y \leq 20,000\}$   
 $D = \{x \in \mathbb{N} \mid 0 \leq x \leq 2000\}$
  - $R = \{y \in \mathbb{R} \mid 0 \leq y \leq 10,000\}$   
 $D = \{x \in \mathbb{N} \mid 0 \leq x \leq 160\}$
  - $R = \{y \in \mathbb{R} \mid 0 \leq y \leq 20,000\}$   
 $D = \{x \in \mathbb{N} \mid 0 \leq x \leq 10,000\}$
  - $R = \{y \in \mathbb{R} \mid 0 \leq y \leq 2000\}$

21. **WEDDING**

Which of the following represents the inverse of the function?

- $f^{-1}(x) = \frac{x-60}{2000}$
- $f^{-1}(x) = \frac{x+50}{3500}$
- $f^{-1}(x) = \frac{x+3500}{50}$
- $f^{-1}(x) = \frac{x-3500}{60}$

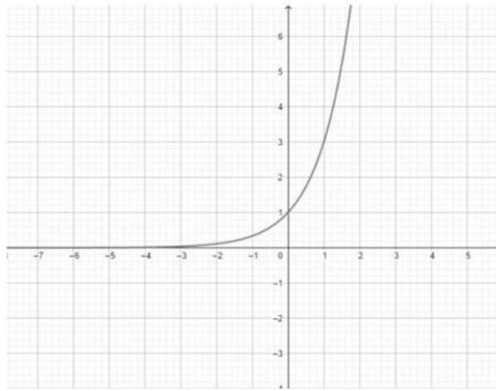
22. **WEDDING**

Which of the following represents the total rental fee as a function of the number of guests?

- $y = 3500 + 60x$
- $y = 3500 - 60x$
- $y = 60 + 3500x$
- $y = 60 - 3500x$

23. Which among the following is a significant observation when solving for  $x$  value of  $25^x > 125^{x-3}$ ?
- The exponents are all the same.
  - The exponents both use  $x$  variable.
  - The bases are greater than 1.
  - The bases are both multiples of 5.
24. Which is equivalent to  $10^{x-5} > 100^{x-10}$ ?
- $10(10)^{x-5} > 100^{x-10}$
  - $10^{x-5} > 10^{2x-20}$
  - $1^{x-5} > 10^{2x-20}$
  - $1^{x-5} < 10^{2x-20}$
25. What are the values of  $x$  in  $8^{x^2} = 2^{2x+1}$ ?
- $-\frac{1}{3}, -1$
  - $-\frac{1}{3}, 1$
  - $\frac{1}{3}, -1$
  - $\frac{1}{3}, 1$
26. In solving for the value of the unknown variable in  $2^{5x} = 64$ , what is the best thing to do first?
- Simplify 64 into  $8^2$
  - Divide 64 by 2
  - Express 64 as  $2^6$
  - Multiply  $5x$  by 2
27. In the given function  $f(x) = 5^x + 2$ , What is the domain of the function?
- $\{x|x \in \mathbb{R}\}$
  - $\{y|y \in \mathbb{R}, y > \frac{1}{3}\}$
  - $\{x|x \in \mathbb{R}, x > 0\}$
  - $\{x|x \in \mathbb{R}, x < 5\}$
28. What is the domain of the function  $f(x) = 3^x$ ?
- All negative numbers
  - All positive numbers
  - All real numbers except 0
  - All real numbers

29. In the graph below, what is the domain of the exponential function?



- a.  $\{x|x \in \mathbb{R}, x < 0\}$
- b.  $\{x|x \in \mathbb{R}, x \geq 0\}$
- c.  $\{x|x \in \mathbb{R}, x \leq 0\}$
- d.  $\{x|x \in \mathbb{R}\}$

30. Which is/are similar among  $f(x) = 2^x$ ,  $g(x) = 4^x$ , and  $h(x) = 7^x$ ?

- a. Asymptotes
- b. Y-intercepts
- c. Both a and b
- d. None of the above

31. What is the value of  $x$  in the logarithmic equation  $\log_7 x = \log_7(2x + 4)$ ?

- a. -4
- b. -2
- c. 2
- d. 4

32. Express  $2 \log_5 a + 4 \log_5 b$  as a single logarithm.

- a.  $\log_5 a^2 b^4$
- b.  $\log_5 2a^4 b$
- c.  $\log_5 a^2 + b^4$
- d.  $\log_5 8ab$

33. What is the expanded form of  $\log \frac{x^2}{\sqrt{y}}$ ?

- a.  $\log x + \log y$
- b.  $2\log x - \frac{1}{2}\log y$
- c.  $2\log x + \log y^{\sqrt{2}}$
- d.  $\log x^2 - \log y^{\frac{1}{2}}$

34. Intercept is where a function crosses the \_\_\_\_\_.

- a. x – axis
- b. x and y axis
- c. y – axis
- d. z – axis

35. **INVESTMENT**

Mr. Peter thought of investing or saving some of his money after all the leisure that he enjoyed. He believes in the saying "early comer is better than hard worker". With ₱10,000.00 remaining cash on hand, he plans to save it in a bank, but he is still in doubt about where to invest the money. Using the formula  $A = P(1 + r)^n$  helps him to solve his problem by answering the questions that follow. " A bank offers him a time deposit of 36% compounded annually, how much will his money be after 10 years?

- a. Php 116,000.00
- b. Php 116,465.70
- c. Php 216,000.00
- d. Php 216,465.70

36. The following situations show the application of the logarithmic functions to real-life situation EXCEPT:

- a. Determining the time your money must double in an amount
- b. Measuring the size of human statistics
- c. Determining the vital statistics of a person
- d. Getting the total number of population in one particular region in a certain time frame

37. **NEW BUSINESS**

Michael borrowed money from Castañas Cooperative Bank at 1.75% simple interest for 5 years to add to his funds for his new business. It was charged ₱ 5,250.00 for interest. How much money will Michael add on his funds for his new business?

- a. Php 459.38
- b. Php 4,593.75
- c. Php 6,000.00
- d. Php 60,000.00

38. **SCHOOL SUPPLY**

To buy the school supplies for the coming school year, you get a summer job at your Municipality. Suppose you save Php 4,200.00 of your salary and deposit it into an account that earns simple interest. After 9 months, the balance is Php 4,263.00. What is the annual interest rate?

- a. 5%
- b. 4%
- c. 3%
- d. 2%

39. **INSURANCE**

Mr. Peter's monthly insurance premium is ₱ 500.00, payable at the end of each month. His policy matures 20 years later, after which he can withdraw all his payments plus the interest earned. If the money is worth 15% compounded monthly. What is the total conversion period of the insurance policy?

- a. 240
- b. 120
- c. 20
- d. 12

40. How much is the fair market value of the truck if it is originally sold at ₱ 250,000 and Dan offered to buy the truck at ₱ 225,000 to which the seller agreed?
- Php 275,000.00
  - Php 250,000.00
  - Php 237,000.00
  - Php 225,000.00
41. A store sells washing machines. Mark offers to give a down payment of ₱5,000 and pay ₱6,000 at the end of every 6 months for two years. Assuming that the money compounds by 3% monthly. What is the economic value of a washing machine?
- Php 20,000.00
  - Php 23,126.31
  - Php 24,545.42
  - Php 28,126.31
42. What is the other term of economic value?
- Fair Market Value
  - Future Value
  - General Annuity
  - Present Value
43. What is the present value of an ordinary annuity having semi-annual payments of ₱8,000 for 12 years with an interest rate of 12% compounded semi-annually?
- Php 110,402.90
  - Php 105,402.90
  - Php 103,402.90
  - Php 100,402.90
44. What is the future value of quarterly payments of ₱2,000 for 5 years with an interest rate of 8% compounded quarterly?
- Php 45,594.74
  - Php 46,594.74
  - Php 47,594.74
  - Php 48,594.74
45. Why would someone buy a bond instead of a stock?
- It is a less risky investment
  - to have ownership in a company
  - it can yield a higher return on investment
  - to receive a dividend payments
46. **BEST CORPORATION**  
Corporation M, with a current market value of ₱ 65.00, give a dividend of ₱ 11.00 per share of its common stock. Corporation N, with a current market value of ₱ 75.00, give a dividend of ₱ 15.00 per share. Find the stock yield ratio for Corporation M.
- 14.56%
  - 15.76%
  - 16.92%
  - 17.08%



47. **BEST CORPORATION**

In which corporation will you invest your money? Why?

- Corporation M, because each peso will earn you more if you invest in M than in N.
- Corporation M, the lower the share the higher the stock yield ratio.
- Corporation N, because each peso will earn you more if you invest in N than in M.
- Corporation N, the lower the stock yield ratio the more you earn.

48. A certain financial institution declared a ₱ 80,000,000.00 dividend for the common stocks. If there is a total of 500,000 shares of common stocks, how much is the dividend per share?

- Php 140.00
- Php 150.00
- Php 160.00
- Php 170.00

49. Refer to the table, what is the lowest price for the past 52 weeks of a stock DEF?

52-WK-HIGH	52-WK-LOW	STOCK	HIGH	LOW	DIV	VOLUME (100s)	CLOSE	NET CHG
64.30	61.00	ABC	63.00	60.00	.70	3050	64.20	0.20
98.00	82.00	DEF	98.00	80.00	.30	700	98.20	-0.2
88.00	84.50	GHI	87.55	83.50	.50	1000	87.50	0.20
74.00	80.50	JKL	72.55	70.50	.30	900	72.50	0.20

- Php 82.00
- Php 84.00
- Php 88.00
- Php 98.00

50. Given the table below; what is the total number of trader who wishes to buy a total of 365,100 shares at Php 22.60 per share.

Bid			Ask/Offer		
Size		Price	Price	Size	
150	365,100	22.6000	22.8000	22,000	1
12	71,600	22.5500	22.9000	185,600	4
40	546,500	22.5000	22.1500	4,100	1

- 120
- 130
- 140
- 150

51. Which of the following defines a stock market index?

- it is a measure of a portion of the stock market
- it is the value of the index
- dividend per share last year
- net change between the two last trading days

52. Which of the following is an example of a business loan?
- auto loans
  - credit cards
  - mezzanine financing
  - mortgages
53. A ₱20,000,000.00 worth of beach resort was bought by Mr. Sy through ABC Bank. However, the bank demands a 20% down payment. How much is the mortgaged amount?
- Php 400,000.00
  - Php 800,000.00
  - Php 4,000,000.00
  - Php 16,000,000.00
54. Mr. Peter borrowed ₱2,500,000.00 to be repaid in full after 10 years with an interest rate of 10% per annum. What is the amount of the principal?
- 10
  - 10%
  - Php 2,500,000.00
  - Php 2,750,000.00
55. Which of the following is an example of a proposition?
- Does it break your heart?
  - Be thankful for being alive.
  - Take courage and have a happy heart.
  - The heart pumps blood throughout the body and it keeps us alive.
56. **PROPOSITION**  
 Consider the following propositions:  
*j: A soft answer turns away wrath.*  
*k: A harsh word stirs up anger.*  
*l: A wise man listens before speaking.*  
 Which is the symbol for the proposition "A soft answer turns away wrath and a harsh word stirs up anger"?
- $\sim j \vee k$
  - $j \wedge k$
  - $j \rightarrow k$
  - $j \leftrightarrow \sim k$
57. **PROPOSITION**  
 Which is the symbol for the proposition "A wise man does not listen before speaking?"
- $\wedge l$
  - $\sim l \rightarrow l$
  - $\sim l$
  - $\vee l$

58. **TRUTH VALUE**

Determine all the truth values of the propositions  $p$  and  $q$  that will make  $p \wedge \sim q$  statement true.

- a.  $p$  and  $q$  are both true
- b.  $p$  and  $q$  are both false
- c.  $p$  and  $q$  are true and false, respectively
- d.  $p$  and  $q$  are false and true, respectively

59. **DECIDE ON THE TRUTH**

In the minutes of the meeting, it is recorded that "All ten members agreed that there will be a monthly contribution of P50.00. Let  $p$  be the statement "The collection for February is P500.00". What is the verbal equivalent of  $\sim p$ ?

- a. The collection for February is not Php 500.00
- b. The collection not February is Php 500.00
- c. All ten members agreed that there will be a monthly contribution of ₱50.00 and the collection for February is ₱500.00.
- d. If all ten members agreed that there will be a monthly contribution of P50.00, then the collection for February is ₱500.00.

60. What is a proposition that is always true?

- a. Absolute
- b. Contradiction
- c. Negation
- d. Tautology

61. Out of the following values, which one is not possible in probability?

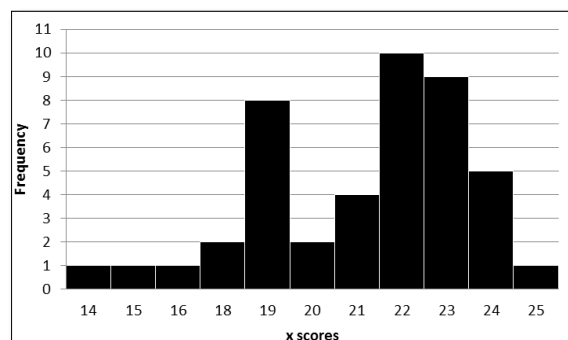
- a.  $P(x) = 1$
- b.  $\sum xP(x) = 3$
- c.  $P(x) = 0.5$
- d.  $P(x) = -0.5$

62. A birthing home recorded the number of live births that materialize in their birthing home in the past 2 years. Which of the following is false about the table below?

Live births per month (Y)	Probability P(Y)
0	0.11
1	0.15
2	0.23
3	0.25
4	0.13
5	0.13

- a. There is a 26% chance that at least 1 baby will be born in any month.
- b. There is a 26% chance that at most 4 babies will be born in any month.
- c. There is a 26% chance that beyond 3 babies will be born in any month.
- d. There is a 49% chance that 3 babies or less will be born in any month.

63. Which of the following is true about probability distribution of discrete random variable?
- The sum of all probabilities is at least 1
  - each probability is a number between 0 and 1
  - each event (or value of  $X$ ) overlaps to each other.
  - each probability of an event is more than or equal to 1
64. Suppose you are to test three random eggplants from a harvest to see if there are worms in it. What is the probability of getting 2 or more worm attack?
- $1/8$
  - $3/8$
  - $1/2$
  - $7/8$
65. A fair coin is tossed three times. What is the probability that one heads will appear?
- $1/8$
  - $2/8$
  - $3/8$
  - $5/8$
66. The histogram below shows the scores (x-axis) of 44 students on their first summative exam in Statistics and Probability and the frequency (y-axis) are the number of students. What is the probability of students who got the score of 22?



- $1/22$
- $10/22$
- $5/11$
- $5/22$

67. The number of tellers ( $x$ ) working with customers at 12:00 noon at a certain grocery store changes from day to day. What is the probability that at least two but fewer than six tellers are occupied at 12:00 noon, based on historical data that shows the probability distribution of  $x$  in the table below?

<i>Number of Tellers (<math>x</math>)</i>	<i>Probability (<math>P(x)</math>)</i>
0	0.029
1	0.049
2	0.078
3	0.155
4	0.212
5	0.262
6	0.215

- a. 0.205
  - b. 0.215
  - c. 0.225
  - d. 0.235
68. The probabilities that a student will buy 1, 2, 3, 4, or 5 items in the canteen are 0.2, 0.3, 0.1, 0.3, and 0.1, respectively. What is the average number of items that a customer will buy?
- a. 3.0
  - b. 2.9
  - c. 2.8
  - d. 2.7
69. Which of the following represents the mean value of a discrete random variable?
- a. expected value
  - b. median
  - c. standard deviation
  - d. variance
70. What is the area between  $z=-1$  and  $z=3$ ?
- a. 0.83
  - b. 0.835
  - c. 0.84
  - d. 0.845
71. If the area is 0.8351, what are the two values of  $z$ ?
- a.  $z=0.24$  and  $z=0.31$
  - b.  $z=1.6$  and  $z=2.1$
  - c.  $z=-0.13$  and  $z=-1.3$
  - d.  $z=-2.5$  and  $z=1$
72. What is the area under the standard normal curve to the right of  $z = -1.25$ ?
- a. 0.8944
  - b. 0.6978
  - c. 0.7193
  - d. 0.5843

73. A normally distributed variable has a value of 25 and the 97.5th percentile has a value of 40. Which of the following is the best estimate of the standard deviation of the variable?
- 2.5
  - 5
  - 7.5
  - 10
74. The final exam scores in a statistics class were normally distributed with a mean of 63 and a standard deviation of five. What is the score of the 70th percentile?
- 63.4
  - 64.3
  - 65.6
  - 66.5
75. Which part of the curve does the 37th percentile can be found?
- left-side
  - right-side
  - both sides
  - neither left nor right side
76. Which of the situations above is a lottery sampling?
- To select his representatives for the Youth Conference at Baguio City, the teacher listed all the names of his students in a small piece of paper which are rolled and then mixed together and pick out 10 rolled papers at random.
  - In a survey, the samples were randomly taken from subsequent cities, then municipalities or barangays, and then households.
  - Mr. Cruz, the municipal mayor wants to know whether his constituents are in favor or not of the Federal form of government to be implemented in the Philippines. He wants to select a sample of 400 from the different groups of his constituents, from the youths, adults, and from the senior citizens.
  - A researcher wish to draw a sample of 200 persons from a population of 600. He selects every 5th person in the list and numbers 1 to 10 will be randomly selected to act as a starting point.
77. How many possible random samples of size 3 can be drawn from a population of size 12?
- 36
  - 1728
  - 144
  - 220
78. What is a sampling technique by which every member of the population is selected with a random start?
- Systematic Sampling
  - Lottery Sampling
  - Cluster Sampling
  - Stratified Random Sampling

79. If the mean of population is 29, then what is the mean of sampling distribution?
- 30
  - 29
  - 28
  - 27
80. A population has a normal distribution with a mean of 50 and a standard deviation of 10. If a random sample of size 9 is taken from the population, then what is the probability that this sample mean will be between 48 and 54?
- 0.611
  - 0.399
  - 0.385
  - 0.228

81. **COVID-19 SERUM**

A new serum designed to enhance the health conditions of COVID-19 patients has been created and in a clinical stage by a pharmaceutical business. 15 randomly chosen COVID-19 patients participated in a clinical trial to evaluate the serum's efficacy. Two groups are randomly assigned to the participants: Group A receives the new serum, while Group B receives a placebo.



Source Link: <https://www.livemint.com/news/india/oxford-covid-19-vaccine-serum-institute-begins-clinical-trial-in-india-11598365676108.html>

As part of the research scientists conducting the study, you are assigned to decide whether the new serum can help the health conditions of COVID-19 patients. With a chosen level of significance of 0.05, the researchers calculate the t-computed value based on the collected data to be -7.43.

Given the small sample size (15), the degrees of freedom for the t-distribution are 14. The critical t-value for a one-tailed test at a 0.05 level of significance with 14 degrees of freedom is approximately  $(-\infty, -2.145)$ .

Which of the following described why t-test used as a statistical test in the given problem?

- Because the level of significance is 0.05 and the population variance is known.
- Because the level of significance is 0.05 and the population variance is unknown.
- Because the sample size is less than 30 and the population variance is known.
- Because the sample size is less than 30 and the population variance is unknown.

82. Which of the following statements is TRUE about the mean of the sample means in a sampling distribution?
- As the sample size increases, the sampling distribution of the means approaches a normal distribution, and the mean of the sample means is equal to the mean of the population.
  - As the sample size increases, the sampling distribution of the means approaches a normal distribution, and the mean of the sample means cannot be equal to the mean of the population.
  - As the sample size increases, the sampling distribution of the means approaches a normal distribution, and the mean of the sample means is equal to 0.
  - As the sample size increases, the sampling distribution of the means is not a normal distribution, and the mean of the sample means is not equal to the mean of the population.
83. Suppose students' ages follow a skewed right distribution with a mean of 23 years old and a standard deviation of 4 years. If we randomly sample 200 students, which of the following statements about the sampling distribution of the sample mean age is incorrect?
- The mean of the sampling distribution is approximately 23 years old.
  - The standard deviation of the sampling distribution is equal to 4 years.
  - The shape of the sampling distribution is approximately normal.
  - all of the choices
84. Which of the statements best describes the Central Limit Theorem?
- for any size sample, it says the sampling distribution of the sample mean is approximately normal
  - for any population, it says the sampling distribution of the sample mean is approximately normal, regardless of the sample size
  - for a large  $n$ , it says the sampling distribution of the sample mean is approximately normal, regardless of the population
  - for a large  $n$ , it says the population is approximately normal
85. The scores of individual students on the UPCAT entrance examination have a normal distribution with mean 18.6 and standard deviation 6.0. At XYZ National High School, 36 SHS students take the test. If the scores at this school have the same distribution as national scores, what is the mean of the sampling distribution of the average (sample mean) score for the 36 students?
- 0.41
  - 1.0
  - 3.1
  - 18.6
86. The average number of pushups a Philippines' army does daily is 300, with a standard deviation of 50. A random sample of 36 AFP is selected. What is the probability that the sample mean is at most 320 push-ups?
- 0.3446
  - 0.6554
  - 0.8767
  - 0.9918



87. Which of the following statement is correct?
- a. The means of the sample drawn from a population may be equal, greater than, or less than the population mean.
  - b. The means of the sample drawn from a population are always equal to the population mean.
  - c. The mean of the sampling distribution of the sample mean is greater than the population mean.
  - d. The mean of the sampling distribution of the sample mean is greater than the population mean.
88. Given the proportion of ladies who prefer wearing sneakers is  $P=0.43$ . How many students should be sampled if we want to estimate population proportion of ladies who preferred wearing sneakers at 99 % confidence with a margin of error equal to 5 %?
- a. 648
  - b. 653
  - c. 658
  - d. 663
89. Consider this another example. Company C is producing steel bars. The owner wants to determine the average length of steel bars (in cm) produced. How many number of steel bars are needed to be tested when the owner wants the length of the confidence interval to be 2 units with confidence level of 90% in estimating a population mean with a prior sample reveals a standard deviation of 5.2 cm.
- a. 76
  - b. 74
  - c. 72
  - d. 70
90. How does the level of confidence affect the sample size? (Consider that other factors are constant)
- a. The higher the level of confidence, the smaller the sample size required.
  - b. The lower the level of confidence, the larger the sample size required.
  - c. The lower the level of confidence, the smaller the sample size required.
  - d. The sample size remains constant at every level of confidence.