

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question

Solve the problem.

- 1) The owners of an industrial plant want to determine which of two types of fuel (gas or electricity) will produce more useful energy at a lower cost. The cost is measured by plant investment per delivered quad (\$ invested /quadrillion BTUs). The smaller this number, the less the industrial plant pays for delivered energy. Suppose we wish to determine if there is a difference in the average investment/quad between using electricity and using gas. Our null and alternative hypotheses would be: 1) _____

- A) $H_0: (\mu_e - \mu_g) = 0$ vs. $H_a: (\mu_e - \mu_g) < 0$ B) $H_0: (\mu_e - \mu_g) = 0$ vs. $H_a: (\mu_e - \mu_g) > 0$
 C) $H_0: (\mu_e - \mu_g) = 0$ vs. $H_a: (\mu_e - \mu_g) \neq 0$ D) $H_0: (\mu_e - \mu_g) = 0$ vs. $H_a: (\mu_e - \mu_g) = 0$

- 2) A random sample of 250 students at a university finds that these students take a mean of 15.5 credit hours per quarter with a standard deviation of 1.8 credit hours. The 99% confidence interval for the mean is 15.5 ± 0.293 . Interpret the interval. 2) _____

- A) We are 99% confident that the average number of credit hours per quarter of the sampled students falls in the interval 15.207 to 15.793 hours.
 B) We are 99% confident that the average number of credit hours per quarter of students at the university falls in the interval 15.207 to 15.793 hours.
 C) The probability that a student takes 15.207 to 15.793 credit hours in a quarter is 0.99.
 D) 99% of the students take between 15.207 to 15.793 credit hours per quarter.

- 3) The director of a hospital wishes to estimate the mean number of people who are admitted to the emergency room during a 24-hour period. The director randomly selects 64 different 24-hour periods and determines the number of admissions for each. For this sample, $\bar{x} = 19.8$ and $s^2 = 16$. If the director wishes to estimate the mean number of admissions per 24-hour period to within 1 admission with 90% reliability, what is the minimum sample size she should use? 3) _____

- A) 27 B) 44 C) 422 D) 693

- 4) A number between 1 and 10, inclusive, is randomly chosen. Events A and B are defined as follows. 4) _____

A : {The number is even}
 B : {The number is less than 7}

Identify the sample points in the event $A \cup B$.

- A) {1, 2, 3, 4, 5, 6, 7, 9} B) {1, 2, 3, 4, 5, 6, 8, 10}
 C) {2, 4, 6} D) {1, 2, 3, 4, 5, 6, 7, 8, 10}

- 5) How many tissues should a package of tissues contain? Researchers have determined that a person uses an average of 63 tissues during a cold. Suppose a random sample of 100 people yielded the following data on the number of tissues used during a cold: $\bar{x} = 53$, $s = 16$. Using the sample information provided, calculate the value of the test statistic for the relevant hypothesis test. 5) _____

- A) $z = \frac{53 - 63}{16}$ B) $z = \frac{53 - 63}{\frac{16^2}{100}}$ C) $z = \frac{53 - 63}{\frac{16}{\sqrt{100}}}$ D) $z = \frac{53 - 63}{\frac{16}{100^2}}$

- 6) The Central Limit Theorem states that the sampling distribution of the sample mean is approximately normal under certain conditions. Which of the following is a necessary condition for the Central Limit Theorem to be used? 6) _____
- A) The population from which we are sampling must be normally distributed.
 B) The population from which we are sampling must not be normally distributed.
 C) The sample size must be large (e.g., at least 30).
 D) The population size must be large (e.g., at least 30).
- 7) The test scores of 30 students are listed below. Which number could be the 30th percentile? 7) _____
- 31 41 45 48 52 55 56 56 63 65
 67 67 69 70 70 74 75 78 79 79
 80 81 83 85 85 87 90 92 95 99
- A) 67 B) 56 C) 64 D) 90
- 8) Fill in the blank. _____ is a method of interpreting the standard deviation of data that have a mound-shaped, symmetric distribution. 8) _____
- A) Chebyshev's Rule B) The Empirical Rule
 C) both A and B D) neither A nor B
- 9) If nothing is known about the shape of a distribution, what percentage of the observations fall within 2 standard deviations of the mean? 9) _____
- A) approximately 5% B) at least 75%
 C) approximately 95% D) at most 25%
- 10) IQ test scores are normally distributed with a mean of 98 and a standard deviation of 15. An individual's IQ score is found to be 122. Find the z-score corresponding to this value. 10) _____
- A) 0.63 B) -1.60 C) 1.60 D) -0.62

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question

- 11) The median household income of a community is reported to be \$62,000. A random sample of six households in the community yielded the following incomes. 11) _____

\$42,000 \$57,000 \$65,000 \$69,000 \$75,000 \$150,000

Does the sample provide sufficient evidence to refute the reported median household income? Perform a sign test using $\alpha = .10$.

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- 12) Consider the following set of salary data: 12) _____

	Men (1)	Women (2)
Sample Size	100	80
Mean	\$12,850	\$13,000
Standard Deviation	\$345	\$500

Suppose the test statistic turned out to be $z = -1.20$ (not the correct value). Find a two-tailed p -value for this test statistic.

- A) .3849 B) .6151 C) .2302 D) .1151

- 13) If a data set is normally distributed, what is the proportion of measurements you would expect to fall within $\mu \pm \sigma$? 13) _____
- A) 95% B) 68% C) 50% D) 100%

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question

- 14) Suppose you want to compare two treatments, A and B. In particular, you wish to determine whether the distribution for population B is shifted to the right of the distribution for population A. You plan to use the Wilcoxon rank sum test. 14) _____
- a. Specify the null and alternative hypotheses you would test.
- b. Suppose you obtained the following independent random samples of observations on experimental units subjected to the two treatments. Conduct the test of hypotheses described above, using $\alpha = .05$.

Sample A: 1.2, 1.5, 2.3, 3.2, 3.7, 4.1
 Sample B: 2.5, 2.8, 3.6, 4.2, 4.5

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question

- 15) We are interested in comparing the average supermarket prices of two leading colas. Our sample was taken by randomly selecting eight supermarkets and recording the price of a six-pack of each brand of cola at each supermarket. The data are shown in the following table: 15) _____

Supermarket	Price		Difference
	Brand 1	Brand 2	
1	\$2.25	\$2.30	\$-0.05
2	2.47	2.45	0.02
3	2.38	2.44	-0.06
4	2.27	2.29	-0.02
5	2.15	2.25	-0.10
6	2.25	2.25	0.00
7	2.36	2.42	-0.06
8	2.37	2.40	-0.03
	$x_1 = 2.3125$	$x_2 = 2.3500$	$d = -0.0375$
	$s_1 = 0.1007$	$s_2 = 0.0859$	$s_d = 0.0381$

If the problem above represented a paired difference, what assumptions are needed for a confidence interval for the mean difference to be valid?

- A) The population variances are equal.
 B) The population of paired differences has an approximately normal distribution.
 C) The samples were independently selected from each population.
 D) All of the above are needed.
- 16) A physical fitness association is including the mile run in its secondary-school fitness test. The time for this event for boys in secondary school is known to possess a normal distribution with a mean of 450 seconds and a standard deviation of 60 seconds. Find the probability that a randomly selected boy in secondary school can run the mile in less than 312 seconds. 16) _____
- A) .0107 B) .9893 C) .4893 D) .5107

- 17) Find the value of t_0 such that the following statement is true: $P(-t_0 \leq t \leq t_0) = .90$ where $df = 14$. 17) _____
 A) 2.624 B) 1.761 C) 1.345 D) 2.145
- 18) A package of self-sticking notepads contains 6 yellow, 6 blue, 6 green, and 6 pink notepads. An experiment consists of randomly selecting one of the notepads and recording its color. Find the probability that a green notepad is selected given that it is either blue or green. 18) _____
 A) $\frac{1}{4}$ B) $\frac{1}{12}$ C) $\frac{1}{2}$ D) $\frac{1}{3}$
- 19) We have created a 99% confidence interval for μ with the result (11, 16). What conclusion will we make if we test $H_0: \mu = 20$ vs. $H_a: \mu \neq 20$ at $\alpha = .01$? 19) _____
 A) Accept H_0 rather than H_a .
 B) Reject H_0 in favor of H_a .
 C) Fail to reject H_0 .
 D) We cannot tell what our decision will be with the information given.
- 20) Compute s^2 and s for the data set: -2, 1, -4, -2, -1, -2 20) _____
 A) 1.67; 1.29 B) 19; 4.36 C) 2; 1.41 D) 2.67; 1.63
- 21) The daily revenue at a university snack bar has been recorded for the past five years. Records indicate that the mean daily revenue is \$2300 and the standard deviation is \$400. The distribution is skewed to the right due to several high volume days (football game days). Suppose that 100 days are randomly selected and the average daily revenue computed. Which of the following describes the sampling distribution of the sample mean? 21) _____
 A) normally distributed with a mean of \$2300 and a standard deviation of \$400
 B) normally distributed with a mean of \$230 and a standard deviation of \$40
 C) normally distributed with a mean of \$2300 and a standard deviation of \$40
 D) skewed to the right with a mean of \$2300 and a standard deviation of \$400
- 22) In a distribution that is skewed to the right, what is the relationship of the mean, median, and mode? 22) _____
 A) mean > median > mode B) median > mean > mode
 C) mode > median > mode D) mode > mean > median
- 23) At the U.S. Open Tennis Championship a statistician keeps track of every serve that a player hits during the tournament. The statistician reported that the mean serve speed of a particular player was 98 miles per hour. Suppose that the statistician indicated that the serve speed distribution was skewed to the left. Which of the following values is most likely the value of the median serve speed? 23) _____
 A) 86 mph B) 92 mph C) 104 mph D) 98 mph
- 24) The Central Limit Theorem is important in statistics because _____. 24) _____
 A) for any size sample, it says the sampling distribution of the sample mean is approximately normal
 B) for a large n , it says the sampling distribution of the sample mean is approximately normal, regardless of the population
 C) for a large n , it says the population is approximately normal
 D) for any population, it says the sampling distribution of the sample mean is approximately normal, regardless of the sample size

25) The mean \bar{x} of a data set is 36.71, and the sample standard deviation s is 3.22. Find the interval representing measurements within one standard deviation of the mean. 25) _____
 A) (35.71, 37.71) B) (30.27, 43.15) C) (33.49, 39.93) D) (27.05, 46.37)

26) Which statement best describes a parameter? 26) _____
 A) A parameter is a sample size that guarantees the error in estimation is within acceptable limits.
 B) A parameter is a numerical measure of a population that is almost always unknown and must be estimated.
 C) A parameter is an unbiased estimate of a statistic found by experimentation or polling.
 D) A parameter is a level of confidence associated with an interval about a sample mean or proportion.

27) Use the standard normal distribution to find $P(-2.25 < z < 1.25)$. 27) _____
 A) .8821 B) .0122 C) .4878 D) .8944

28) Calculate or use a table to find the binomial probability $P(x \geq 7)$ when $n = 8$ and $p = .5$. 28) _____
 A) .965 B) .996 C) .004 D) .035

29) The top speeds for a sample of five new automobiles are listed below. Calculate the standard deviation of the speeds. 29) _____

140, 125, 180, 115, 105

A) 121.04 B) 212.3205 C) 29.2831 D) 151.4447

30) Probabilities of different types of vehicle-to-vehicle accidents are shown below: 30) _____

Accident	Probability
Car to Car	0.68
Car to Truck	0.10
Truck to Truck	0.22

Find the probability that an accident involves a car.

A) 0.22 B) 0.78 C) 0.68 D) 0.10

31) A 90% confidence interval for the mean percentage of airline reservations being canceled on the day of the flight is (1.1%, 3.4%). What is the point estimator of the mean percentage of reservations that are canceled on the day of the flight? 31) _____

A) 2.25% B) 1.15% C) 1.70% D) 2.3%

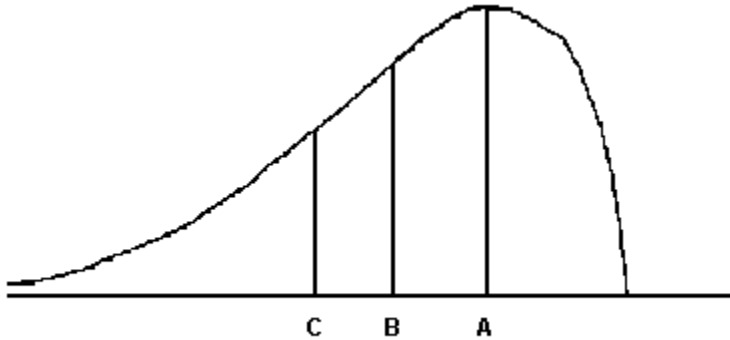
32) Which one of the following suggests that the data set is approximately normal? 32) _____

- A) A data set with $Q_1 = 2.2$, $Q_3 = 7.3$, and $s = 2.1$.
- B) A data set with $Q_1 = 1330$, $Q_3 = 2940$, and $s = 2440$.
- C) A data set with $Q_1 = 14$, $Q_3 = 68$, and $s = 41$.
- D) A data set with $Q_1 = 105$, $Q_3 = 270$, and $s = 33$.

- 33) Fill in the blank. _____ gives us a method of interpreting the standard deviation of any data set, regardless of the shape of the distribution. 33) _____
- A) The Empirical Rule
 B) Chebyshev's Rule
 C) both A and B
 D) neither A nor B

- 34) The average score of all golfers for a particular course has a mean of 70 and a standard deviation of 4.5. Suppose 81 golfers played the course today. Find the probability that the average score of the 81 golfers exceeded 71. 34) _____
- A) .1293
 B) .0228
 C) .4772
 D) .3707

- 35) _____ 35) _____



For the distribution drawn here, identify the mean, median, and mode.

- A) A = mean, B = mode, C = median
 B) A = median, B = mode, C = mean
 C) A = mode, B = median, C = mean
 D) A = mode, B = mean, C = median
- 36) A random sample of 250 students at a university finds that these students take a mean of 14.7 credit hours per quarter with a standard deviation of 2.2 credit hours. Estimate the mean credit hours taken by a student each quarter using a 98% confidence interval. 36) _____
- A) $14.7 \pm .021$
 B) $14.7 \pm .014$
 C) $14.7 \pm .219$
 D) $14.7 \pm .324$
- 37) A recent article in the paper claims that business ethics are at an all-time low. Reporting on a recent sample, the paper claims that 40% of all employees believe their company president possesses low ethical standards. Suppose 20 of a company's employees are randomly and independently sampled and asked if they believe their company president has low ethical standards and their years of experience at the company. Could the probability distribution for the number of years of experience be modelled by a binomial probability distribution? 37) _____
- A) Yes, the sample size is $n = 20$.
 B) No, a binomial distribution requires only two possible outcomes for each experimental unit sampled.
 C) Yes, the sample is a random and independent sample.
 D) No, the employees would not be considered independent in the present sample.

- 38) The table displays the probabilities for each of the outcomes when three fair coins are tossed and the number of heads is counted. Find the probability that the number of heads on a single toss of the three coins is at most 2.

38) _____

Outcome	0	1	2	3
Probability	.125	.375	.375	.125

- A) .875 B) .500 C) .750 D) .125

- 39) In a controlled laboratory environment, a random sample of 10 adults and a random sample of 10 children were tested by a psychologist to determine the room temperature that each person finds most comfortable. The data are summarized below:

39) _____

	Sample Mean	Sample Variance
Adults (1)	77.5° F	4.5
Children (2)	74.5°F	2.5

Suppose that the psychologist decides to construct a 99% confidence interval for the difference in mean comfortable room temperatures instead of proceeding with a test of hypothesis. The 99% confidence interval turns out to be (-2.9, 3.1). Select the correct statement.

- A) It can be concluded at the 99% confidence level that the true mean room temperature for adults exceeds that for children.
- B) It can be concluded at the 99% confidence level that the true mean comfortable room temperature for children exceeds that for adults.
- C) It cannot be concluded at the 99% confidence level that there is actually a difference between the true mean comfortable room temperatures for the two groups.
- D) It can be concluded at the 99% confidence level that the true mean comfortable room temperature is between -2.9 and 3.1.

- 40) Which of the following is not a method used for determining whether data are from an approximately normal distribution?

40) _____

- A) Find the interquartile range, IQR, and standard deviation, s , for the sample. Then $\frac{\text{IQR}}{s} \approx 1.3$.
- B) Construct a histogram or stem-and-leaf display. The shape of the graph or display should be uniform (evenly distributed).
- C) Compute the intervals $\bar{x} \pm s$, $\bar{x} \pm 2s$, and $\bar{x} \pm 3s$. The percentages of measurements falling in each should be approximately 68%, 95%, and 100% respectively.
- D) Construct a normal probability plot. The points should fall approximately on a straight line.

- 41) Each manager of a corporation was rated as being either a good, fair, or poor manager by his/her boss. The manager's educational background was also noted. The data appear below: 41) _____

Educational Background

Manager Rating	H. S. Degree	Some College	College Degree	Master's or Ph.D.	Totals
Good	6	7	22	4	39
Fair	2	18	44	23	87
Poor	9	5	3	17	34
Totals	17	30	69	44	160

Given that a manager is rated as fair, what is the probability that this manager has no college background?

- A) $\frac{2}{17}$ B) $\frac{51}{80}$ C) $\frac{1}{80}$ D) $\frac{2}{87}$
- 42) I want to test $H_0: p = .6$ vs. $H_a: p \neq .6$ using a test of hypothesis. If I concluded that p is $.6$ when, in fact, the true value of p is not $.6$, then I have made a _____. 42) _____
- A) correct decision B) Type I error
C) Type I and Type II error D) Type II error

- 43) A confidence interval for $(\mu_1 - \mu_2)$ is $(5, 8)$. Which of the following inferences is correct? 43) _____
- A) $\mu_1 < \mu_2$ B) no significant difference between means
C) $\mu_1 = \mu_2$ D) $\mu_1 > \mu_2$

- 44) Use the standard normal distribution to find $P(0 < z < 2.25)$. 44) _____
- A) .5122 B) .4878 C) .8817 D) .7888

- 45) A sociologist recently conducted a survey of senior citizens who have net worths too high to qualify for Medicaid but have no private health insurance. The ages of the 25 uninsured senior citizens were as follows: 45) _____

72 77 70 80 90
78 65 93 69 94
73 96 80 66 85
67 72 85 74 77
64 91 79 68 86

Find the median of the observations.

- A) 78 B) 77.5 C) 74 D) 77
- 46) A number between 1 and 10, inclusive, is randomly chosen. Events A and B are defined as follows. 46) _____
- A : {The number is even}
 B : {The number is less than 7}

Identify the sample points in the event $A \cap B$.

- A) {1, 2, 3, 4, 5, 6, 8, 10} B) {1, 2, 3, 4, 5, 6, 7, 9}
C) {2, 4, 6} D) {1, 2, 3, 4, 5, 6, 7, 8, 10}

47) We believe that 93% of the population of all Business Statistics I students consider statistics to be an exciting subject. Suppose we randomly and independently selected 38 students from the population. If the true percentage is really 93%, find the probability of observing 37 or more students who consider statistics to be an exciting subject. 47) _____
 A) 0.755114 B) 0.063438 C) 0.244886 D) 0.181447

48) A radio station claims that the amount of advertising each hour has a mean of 14 minutes and a standard deviation of 1.3 minutes. You listen to the radio station for 1 hour and observe that the amount of advertising time is 16 minutes. Calculate the z-score for this amount of advertising time. 48) _____
 A) $z = -1.54$ B) $z = 1.05$ C) $z = 2.6$ D) $z = 1.54$

49) A local eat-in pizza restaurant wants to investigate the possibility of starting to deliver pizzas. The owner of the store has determined that home delivery will be successful only if the average time spent on a delivery does not exceed 40 minutes. The owner has randomly selected 18 customers and delivered pizzas to their homes in order to test whether the mean delivery time actually exceeds 40 minutes. What assumption is necessary for this test to be valid? 49) _____
 A) None. The Central Limit Theorem makes any assumptions unnecessary.
 B) The population of delivery times must have a normal distribution.
 C) The sample mean delivery time must equal the population mean delivery time.
 D) The population variance must equal the population mean.

50) How many tissues should a package of tissues contain? Researchers have determined that a person uses an average of 43 tissues during a cold. Suppose a random sample of 10,000 people yielded the following data on the number of tissues used during a cold: $\bar{x} = 34, s = 21$. We want to test the alternative hypothesis $H_a: \mu < 43$. State the correct rejection region for $\alpha = .05$. 50) _____
 A) Reject H_0 if $z < -1.645$. B) Reject H_0 if $z > 1.96$ or $z < -1.96$.
 C) Reject H_0 if $z < -1.96$. D) Reject H_0 if $z > 1.645$.

51) Find a value of the standard normal random variable z , called z_0 , such that $P(z \leq z_0) = 0.70$. 51) _____
 A) .98 B) .81 C) .47 D) .53

52) The scores for a statistics test are as follows: 52) _____
 74 76 69 77 63 92 61 85 79 89
 79 88 50 70 85 86 85 87 18 67

Compute the mean score.
 A) 77.20 B) 74.00 C) 75 D) 64.95

53) A revenue department is under orders to reduce the time small business owners spend filling out pension form ABC-5500. Previously the average time spent on the form was 5.4 hours. In order to test whether the time to fill out the form has been reduced, a sample of 80 small business owners who annually complete the form was randomly chosen, and their completion times recorded. The mean completion time for ABC-5500 form was 5.2 hours with a standard deviation of 2.6 hours. In order to test that the time to complete the form has been reduced, state the appropriate null and alternative hypotheses. 53) _____
 A) $H_0: \mu > 5.4$ B) $H_0: \mu = 5.4$ C) $H_0: \mu = 5.4$ D) $H_0: \mu = 5.4$
 $H_a: \mu < 5.4$ $H_a: \mu \neq 5.4$ $H_a: \mu < 5.4$ $H_a: \mu > 5.4$

54) A small computing center has found that the number of jobs submitted per day to its computers has a distribution that is approximately mound-shaped and symmetric, with a mean of 78 jobs and a standard deviation of 6. Where do we expect approximately 95% of the distribution to fall? 54) _____
 A) between 72 and 84 jobs per day B) between 66 and 90 jobs per day
 C) between 60 and 96 jobs per day D) between 90 and 96 jobs per day

55) How much money does the average professional football fan spend on food at a single football game? That question was posed to 10 randomly selected football fans. The sample results provided a sample mean and standard deviation of \$12.00 and \$2.60, respectively. Use this information to construct a 90% confidence interval for the mean. 55) _____
 A) $12 \pm 1.796(2.60/\sqrt{10})$ B) $12 \pm 1.812(2.60/\sqrt{10})$
 C) $12 \pm 1.383(2.60/\sqrt{10})$ D) $12 \pm 1.833(2.60/\sqrt{10})$

56) Find a value of the standard normal random variable z , called z_0 , such that $P(-z_0 \leq z \leq z_0) = 0.98$. 56) _____
 A) 1.645 B) 1.96 C) 2.33 D) .99

57) Which of the following is a measure of relative standing? 57) _____
 A) mean B) z -score C) variance D) pie chart

58) Consider the given discrete probability distribution. Find $P(x > 3)$. 58) _____

x	1	2	3	4	5
$p(x)$.1	.2	.2	.3	.2

A) .7 B) .5 C) .2 D) .3

59) An industrial supplier has shipped a truckload of teflon lubricant cartridges to an aerospace customer. The customer has been assured that the mean weight of these cartridges is in excess of the 12 ounces printed on each cartridge. To check this claim, a sample of $n = 15$ cartridges are randomly selected from the shipment and carefully weighed. Summary statistics for the sample are: $\bar{x} = 12.13$ ounces, $s = .30$ ounce. To determine whether the supplier's claim is true, consider the test, $H_0: \mu = 12$ vs. $H_a: \mu > 12$, where μ is the true mean weight of the cartridges. Find the rejection region for the test using $\alpha = .01$. 59) _____
 A) $|z| > 2.58$ B) $t > 2.624$, where t depends on 14 df
 C) $z > 2.33$ D) $t > 2.977$, where t depends on 14 df

60) Given $H_0: \mu = 25$, $H_a: \mu \neq 25$, and $p = 0.035$. Do you reject or fail to reject H_0 at the .01 level of significance? 60) _____
 A) fail to reject H_0
 B) reject H_0
 C) not sufficient information to decide

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- 61) Nine students took the SAT test. Their scores are listed below. Later, they took a test preparation course and retook the SAT. Their new scores are listed below. Use the Wilcoxon signed rank test to test the claim that the test preparation had no effect on their scores. Use $\alpha = .05$. 61) _____

Student	1	2	3	4	5	6	7	8	9
Before Score	1000	1110	990	1060	840	1030	1070	1130	850
After Score	1020	1110	980	1100	870	1040	1060	1170	870

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- 62) A recent survey found that 60% of all adults over 50 wear glasses for driving. In a random sample of 100 adults over 50, what is the mean and standard deviation of the number who wear glasses? 62) _____
 A) mean: 40; standard deviation: 7.75 B) mean: 60; standard deviation: 4.9
 C) mean: 60; standard deviation: 7.75 D) mean: 40; standard deviation: 4.9

- 63) Consider the following set of salary data: 63) _____

	Men (1)	Women (2)
Sample Size	100	80
Mean	\$12,850	\$13,000
Standard Deviation	\$345	\$500

To determine if women have a higher mean salary than men, we would test:

- A) $H_0: \mu_1 - \mu_2 = 0$ vs. $H_a: \mu_1 - \mu_2 < 0$ B) $H_0: \mu_1 - \mu_2 = 0$ vs. $H_a: \mu_1 - \mu_2 > 0$
 C) $H_0: \mu_1 - \mu_2 = 0$ vs. $H_a: \mu_1 - \mu_2 = 0$ D) $H_0: \mu_1 - \mu_2 = 0$ vs. $H_a: \mu_1 - \mu_2 \neq 0$
- 64) An industrial supplier has shipped a truckload of teflon lubricant cartridges to an aerospace customer. The customer has been assured that the mean weight of these cartridges is in excess of the 14 ounces printed on each cartridge. To check this claim, a sample of $n = 25$ cartridges are randomly selected from the shipment and carefully weighed. Summary statistics for the sample are: $\bar{x} = 14.17$ ounces, $s = .25$ ounce. To determine whether the supplier's claim is true, consider the test, $H_0: \mu = 14$ vs. $H_a: \mu > 14$, where μ is the true mean weight of the cartridges. Calculate the value of the test statistic. 64) _____
 A) 3.400 B) 0.680 C) 17.000 D) 1.700

- 65) A physical fitness association is including the mile run in its secondary-school fitness test. The time for this event for boys in secondary school is known to possess a normal distribution with a mean of 450 seconds and a standard deviation of 60 seconds. Between what times do we expect approximately 95% of the boys to run the mile? 65) _____
 A) between 351.3 and 548.736 seconds B) between 0 and 548.736 seconds
 C) between 355 and 545 seconds D) between 332.4 and 567.6 seconds

- 66) For a valid signed rank test, the probability distribution from which the sample of paired differences is drawn must be continuous. 66) _____
 A) True B) False

Answer the question True or False.

67) In skewed distributions, the mean is the best measure of the center of the distribution since it is least affected by extreme observations. 67) _____
A) True B) False

68) The Wilcoxon rank sum test is used to test the hypothesis that the probability distributions associated with two populations are equivalent. 68) _____
A) True B) False