8

NOTA means "**none of these answers.**"

A normal curve probability table arid selected formulas follow question 30.

1. Twenty-five Girl Scouts answered a survey on their favorite dessert: pie, cake, or brownies. Many listed more than one as their favorite. Eighteen included pie as a favorite and 12 included brownies as a favorite. If nine chose pie and cake only. Five chose brownies only, one chose pie and brownies only, and none chose cake and brownies only, how many chose cake only as their favorite dessert?

   A. 0 B. 1 C. 2 D. 3 E. NOTA

2. If p is the probability that an event will occur on any trial, what is the probability that the event will occur exactly twice in three trials?

   A. $2p^3$ B. $p^2 - p^3$ C. $3p^2 - p^3$ D. $3p^2 - 3p^3$ E. NOTA

3. How many distinguishable permutations are there of the letters of the word PROBABILITY?

   A. 39,916,800 B. 19,958,400 C. 9,979,200 D. 4,989,600 E. NOTA

4. If seven out of every ten doctors recommend Brand X toothpaste, what is the probability that out of Doctors A, B. and C, at least one of them recommend Brand X?

   A. .027 B. .147 C. .490 D. .973 E. NOTA

5. Nancy and Ginger are playing tennis. If the odds of Nancy winning are7 to 5, what is the probability that Ginger will win?

   A. $\frac{2}{7}$ B. $\frac{2}{5}$ C. $\frac{5}{7}$ D. $\frac{7}{12}$ E. NOTA

6. Given the probability function $P(x) = \frac{5 - x}{10}$, for $x = 1, 2, 3, 4$, find the expected value.

   A. 1.5 B. 2.0 C. 2.5

   D. Cannot determine with the given information. E. NOTA

7. Consider an experiment that consists of recording the birthday for each of six randomly selected persons. if we ignore leap years and assume that there are only possible distinct birthdays. find the probability that each person in the 6 selected has a different birthday. [Round to thousandths.]

A. 001 B. .040 C. .960 D. .999 E. NOTA

8. A target is made up of four concentric circles, each two inches apart. The innermost circle has a radius of one inch. Darts are randomly tossed at the target. Assuming that the dart hits the target at each toss, what is the probability that the dart will hit the interior of the innermost circle?

A. $\frac{1}{7}$ B. $\frac{1}{49}$ C. $\frac{7}{48}$ D. $\frac{6}{49}$ E. NOTA

9. Over a period of years, a car manufacturing firm finds that 18% of their cars develop body squeaks within the guarantee period. In a randomly selected shipment, twenty cars reach the end of the guarantee period and none develop squeaks. What is the probability of this happening?

A. 0 B. 1.27×10^{-15} C. .981 D. 1.00 E. NOTA

10. There are three boxes.

Box 1 contains one red ball and three white balls.
Box 2 contains two red balls and two white balls.
Bar 3 contains three red balls and one white ball.

A box is selected at random, then a ball is chosen at random from the selected box. Determine the conditional probability that Box 1 was selected, given that a red ball is chosen.

A. $\frac{1}{6}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$ E. NOTA

11. Let event A be drawing a king from a deck of 52 cards and event B be drawing a heart from a deck of 52 cards. Which of the following statements is/are true?

I. $P(A|B) + P(\overline{A}|\overline{B}) = 1$

II. $P(A|B) + P(A|\overline{B}) = 1$

III. $P(A|B) + P(\overline{A}|B) = 1$

A. I only B. III only C. II and III only

D. I, II, and III E. NOTA

12. Two numbers are picked from a set of numbers {1, 2, 3, 4, 5}. What is the probability that their sum is greater than three?

A. $\frac{3}{25}$ B. $\frac{8}{25}$ C. $\frac{11}{25}$ D. $\frac{22}{25}$ E. NOTA

13. If two cards are randomly selected from a standard 52-card deck, what is the probability that they will be of different suits?

A. $\frac{13}{17}$ B. $\frac{10}{13}$ C. $\frac{3}{4}$ D. $\frac{4}{17}$ E. NOTA

14. Hydraulic landing assemblies coming from a rework facility are inspected for defects. Historical records indicate that 8% have defects in shafts only, 6% have defects in bushings only, and 2% have defects in both shafts and bushings. One of the hydraulic assemblies is selected randomly. Which of the following is/are true?

I. P(it has a bashing defect) = .08
II. P(it has a shaft or bushing defect) = .12
III. P(it has exactly one of the two types of defects) = .14
IV. P(it has neither type of defect) = .86

A. I only B. I, III only C. I, II, III only D. I, III, IV only E. NOTA

15. John had a key for his house, a key for his grandmother's house, a key for his Mom's car, a key for his motor bike, and a key for his PE locker. How many distinct arrangements are there for these keys on his circular key ring?

A. 12 B. 24 C. 60 D. 120 E. NOTA

16. Given the set of data {4, 8, 1, 3, 5, 1, 7, 2, 5}. Which of the following statements is/are true?

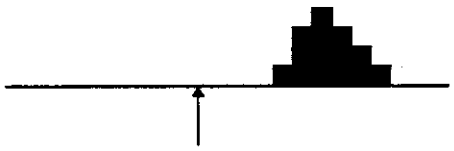
I. The median score is 5.
II. The set is bimodal.
III. The mean is 4.
IV. The range is 8.

A. II only B. II, III only C. I, II, III only D. I, II, III, IV E. NOTA

17. A set of final examination scores were normally distributed with $\mu = 78.2$ and $\sigma = 4.3$. What percent of the scores were over 85? [Round to the nearest whole percent.]

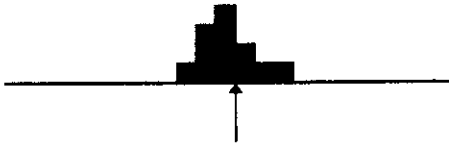
A. 2% B. 4% C. 6% D. 8% E. NOTA

18. Which of the sampling distributions shown displays a large bias and low variability?

A. 

B. 

C. 

D. 

E. NOTA

19. The middle 60% of a normally distributed population, where $\mu = 37$ and $\sigma = 47$,lies between what two raw scores?

A. 36.16 and 37.84 B. 33.64 and 40.36 C. 35.8 and 38.2

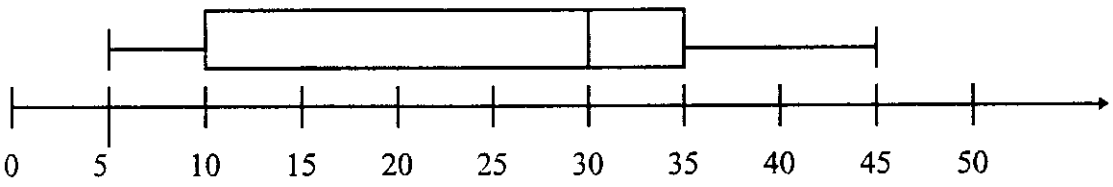
D. 34.6 and 39.4 E. NOTA

20. To use parametric statistical tests some underlying assumptions about the population(s) from which the data is/are drawn must be met. Which of the following is/are assumptions characterizing parametric tests?

I. Homogeneity of variance
II. Distribution-free population(s)
III. Normal population(s)
IV. Skewed population(s)

A. III only B. I, II only C. I, III only D. I, IV only E. NOTA

21. Which of the following statements is/are true far the distribution described in the boxplot shown?



I. $\mu = 30$
II. The interquartile range is 20.
III. $Q_1 = 15$.
IV. The median is 30.
V. The distribution is normal.

A. I, II, V only B. II, IV only C. II, III, IV only D. I, II, III, V only E. NOTA

22. An anthropologist wishes to estimate the average height of men for a certain race of people. If the population standard deviation is assumed to be 2.5 inches and if she randomly samples 100 men, find the probability that the difference between the sample mean and the true population mean will not exceed 0.5 inches.

A. .0456 B. .3830 C. .4772 D. .9545 E. NOTA

23. A school club is holding a raffle to raise money. One-thousand tickets will be sold for $1.00 each. The prize is a $300.00 stereo/CD system. What is Mark's mathematical expectation if he buys two tickets?

A. $300.00 B. $298.00 C. −$2.00 D. −$1.40 E. NOTA

24. The Mendelian theory states that the number of a certain type of peas falling into the classifications round & yellow, wrinkled & yellow, round & green, and wrinkled & green should be in the ratio 9:3:3:1. Suppose that 100 such peas revealed 56, 19, 17, and 8 in the respective categories. Is the data consistent with the Mendelian model at $\alpha = .05$? [The critical chi-squared at $\alpha = .05$ with df = 3 is 7.81473.]

A. χ^2 =.13, data is consistent with model

B. χ^2 = .43, data is consistent with model

C. χ^2 = .66, data is consistent with model

D. χ^2 = 9.6, data is not consistent with model

E. NOTA

25. The ANOVA Source Table for a randomized block experimental design is shown below. Determine if the data present is sufficient evidence to indicate a significant difference in the mean response for treatments at the .05 level. [The critical F at .05 and the appropriate degrees of freedom is 5.14.]

ANOVA Source Table

Source	df	SS	MS	F
Blocks	3	3.48	1.160	
Treatments	2	5.48	2.740	
Error	6	.45	.075	
Total	11	9.41		

A. F = 2.74, not significant B. F = 8.22, significant

C. F = 15.47, not significant D. F = 36.53, significant E. NOTA

26. Find the mean (to the nearest hundredths) of the frequency distribution shown.

x	2	3	4	5
frequency	5	4	3	2

A. 1.00 B. 1.57 C. 3.14 D. 3.50 E. NOTA

27. A high school principal was concerned with the amount of time her students devote to working after-school jobs. She randomly selected 25 students, obtained their working hours for one week, and computed $\overline{X} = 12.3$ hours and $s = 112$. She claims that her students work significantly more than the mean of 10.7 hours obtained from a study conducted by the National Federation of State High School Association. Find the appropriate alternate hypothesis to be used and the action to be taken as a result of her study. Use $\alpha = .05$. [The critical t-soare at the .05 level and df =24 is 1.711.]

A. $H_a : \mu > 10.7$, reject H_0 B. $H_a : \mu > 10.7$, do not reject H_0

C. $H_a : \mu = 10.7$, reject H_0 D. $H_a : \mu \leq 10.7$, do not reject H_0 E. NOTA

28. The linear correlation coefficient, r, is defined by

$$r = \frac{n\left(\sum xy\right) - \left(\sum x\right)\left(\sum y\right)}{\sqrt{n\left(\sum x^2\right) - \left(\sum x\right)^2}\sqrt{n\left(\sum y^2\right) - \left(\sum y\right)^2}}.$$

A set of eight pairs of scores gives the following sums: $\sum x = 14.6$, $\sum y = 26$, $\sum xy = 56.8$, $\sum x^2 = 32.9632$, and $\sum y^2 = 104$. Find r, rounded to the nearest thousandths.

A. − .212 B. − .140 C. .158 D. .842 E. NOTA

29. In a hypothesis testing procedure, a test statistic was found to have a p-value of .0294. At the .05 level of significance, which of the following statements is appropriate?

A. Reject H_0, the rest statistic is significant

B. Do not reject H_0, the test statistic is significant

C. Reject H_0, the test statistic is not significant

D. Do not reject H_0, test statistic is not significant

E. NOTA

30. Assuming that a collection of paired data includes at least three pairs of values, which of the following statements is true about the linear correlation coefficient, r, if the standard error of the estimate, s_e, equals zero?

A. $r = \pm 1$ B. $-1 < r < 1$ C. $r = 0$

D. not enough information to determine r E. NOTA

Selected Formulas

$$\mu = \sum x\, P(x) \qquad z = \frac{x - \mu}{\sigma}$$

$$\sigma^2 = \frac{n\sum x^2 - (\sum x)^2}{n(n-1)} \qquad z = \frac{x - \mu}{\sigma/\sqrt{n}}$$

$$\chi^2 = \sum \frac{(O - E)^2}{E} \qquad \sigma^2 = \sum x^2 P(x) - \mu^2$$

Table of Normal Curve Areas

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.0000	.0040	.0080	.0120	.0160	.0199	.0239	.0279	.0319	.0359
0.1	.0398	.0438	.0447	.0517	.0557	.0596	.0636	.0675	.0714	.0753
0.2	.0793	.0832	.0871	.0910	.0948	.0987	.1026	.1064	.1103	.1141
0.3	.1179	.1217	.1255	.1293	.1331	.1368	.1406	.1443	.1480	.1517
0.4	.1554	.1591	.1628	.1664	.1700	.1736	.1772	.1808	.1844	.1879
0.5	.1915	.1950	.1985	.2019	.2054	.2088	.2123	.2157	.2190	.2224
0.6	.2257	.2291	.2324	.2357	.2389	.2422	.2454	.2486	.2517	.2549
0.7	.2580	.2611	.2642	.2673	.2704	.2734	.2764	.2794	.2823	.2852
0.8	.2881	.2910	.2939	.2967	.2995	.3023	.3051	.3078	.3106	.3133
0.9	.3159	.3186	.3212	.3238	.3264	.3289	.3315	.3340	.3365	.3389
1.0	.3413	.3438	.3461	.3485	.3508	.3531	.3554	.3577	.3599	.3621
1.1	.3643	.3665	.3686	.3708	.3729	.3749	.3770	.3790	.3810	.3830
1.2	.3849	.3869	.3888	.3907	.3925	.3944	.3962	.3980	.3997	.4015
1.3	.4032	.4049	.4066	.4082	.4099	.4115	.4131	.4147	.4162	.4177
1.4	.4192	.4207	.4222	.4236	.4251	.4265	.4279	.4292	.4306	.4319
1.5	.4332	.4345	.4357	.4370	.4382	.4394	.4406	.4418	.4429	.4441
1.6	.4452	.4463	.4474	.4484	.4495	.4505	.4515	.4525	.4535	.4545
1.7	.4554	.4564	.4573	.4582	.4591	.4599	.4608	.4616	.4625	.4633
1.8	.4641	.4649	.4656	.4664	.4671	.4678	.4686	.4693	.4699	.4706
1.9	.4713	.4719	.4726	.4732	.4738	.4744	.4750	.4756	.4761	.4767
2.0	.4772	.4778	.4783	.4788	.4793	.4798	.4803	.4808	.4812	.4817
2.1	.4821	.4826	.4830	.4834	.4838	.4842	.4846	.4850	.4854	.4857
2.2	.4861	.4864	.4868	.4871	.4875	.4878	.4881	.4884	.4887	.4890
2.3	.4893	.4896	.4898	.4901	.4904	.4906	.4909	.4911	.4913	.4916
2.4	.4918	.4920	.4922	.4925	.4927	.4929	.4931	.4932	.4934	.4936
2.5	.4938	.4940	.4941	.4943	.4945	.4946	.4948	.4949	.4951	.4952
2.6	.4953	.4955	.4956	.4957	.4959	.4960	.4961	.4962	.4963	.4964
2.7	.4965	.4966	.4967	.4968	.4969	.4970	.4971	.4972	.4973	.4974
2.8	.4074	.4975	.4976	.4977	.4977	.4978	.4979	.4979	.4980	.4981
2.9	.4981	.4982	.4982	.4983	.4984	.4984	.4985	.4985	.4986	.4986
3.0	.4987	.4987	.4987	.4988	.4988	.4989	.4989	.4989	.4990	.4990