20. Given a probability of .65 that interest rates will jump this year, and a probability of .72 that if interest rates jump the stock market will decline, what is the probability that interest rates will jump and the stock market will decline?

(A) $.72 + .65 - (.72)(.65)$
(B) $(.72)(.65)$
(C) $1 - (.72)(.65)$
(D) $\frac{.65}{.72}$
(E) $1 - \frac{.65}{.72}$

21. Sampling error is

(A) the mean of a sample statistic.
(B) the standard deviation of a sample statistic.
(C) the standard error of a sample statistic.
(D) the result of bias.
(E) the difference between a population parameter and an estimate of that parameter.

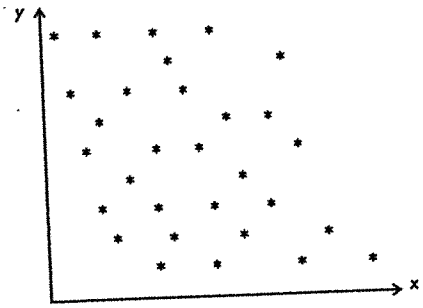
22. Suppose that the weights of trucks traveling on the interstate highway system are normally distributed. If 70% of the trucks weigh more than 12,000 pounds and 80% weigh more than 10,000 pounds, what are the mean and standard deviation for the weights of trucks traveling on the interstate system?

(A) $\mu = 14{,}900$; $\sigma = 6100$
(B) $\mu = 15{,}100$; $\sigma = 6200$
(C) $\mu = 15{,}300$; $\sigma = 6300$
(D) $\mu = 15{,}500$; $\sigma = 6400$
(E) The mean and standard deviation cannot be computed from the information given.

23. If the correlation coefficient $r = .78$, what percentage of variation in y is explained by variation in x?

(A) 22%
(B) 39%
(C) 44%
(D) 61%
(E) 78%

24. Consider the following scatterplot:



Which of the following is the best estimate of the correlation between x and y?

(A) −.95
(B) −.15
(C) 0
(D) .15
(E) .95

25. For one NBA playoff game the actual percentage of the television viewing public who watched the game was 24%. If you had taken a survey of 50 television viewers that night and constructed a confidence interval estimate of the percentage watching the game, which of the following would have been true?

I. The center of the interval would have been 24%.
II. The interval would have contained 24%.
III. A 99% confidence interval estimate would have contained 24%.

(A) I and II
(B) I and III
(C) II and III
(D) All are true.
(E) None is true.

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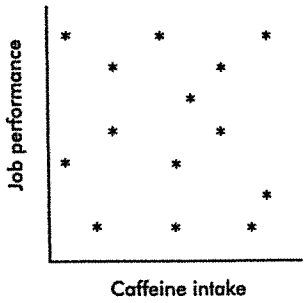
26. Which of the following is a true statement?

(A) In a well-designed, well-conducted sample survey, sampling error is effectively eliminated.
(B) In a well-designed observational study, responses are influenced through an orderly, carefully planned procedure during the collection of data.
(C) In a well-designed experiment, the treatments are carefully planned to result in responses that are as similar as possible.
(D) In a well-designed experiment, double-blinding is a useful matched pairs design.
(E) None of the above is a true statement.

27. Consider the following scatterplot showing the relationship between caffeine intake and job performance.



Which of the following is a reasonable conclusion?

(A) Low caffeine intake is associated with low job performance.
(B) Low caffeine intake is associated with high job performance.
(C) High caffeine intake is associated with low job performance.
(D) High caffeine intake is associated with high job performance.
(E) Job performance cannot be predicted from caffeine intake.

28. An author of a new book claims that anyone following his suggested diet program will lose an average of 2.8 pounds per week. A researcher believes that the true figure will be lower and plans a test involving a random sample of 36 overweight people. She will reject the author's claim if the mean weight loss in the volunteer group is less than 2.5 pounds per week. Assume that the standard deviation among individuals is 1.2 pounds per week. If the true mean value is 2.4 pounds per week, what is the probability that the researcher will mistakenly fail to reject the author's false claim of 2.8 pounds?

(A) $P\left(z > \dfrac{2.5 - 2.4}{1.2/\sqrt{36}}\right)$

(B) $P\left(z < \dfrac{2.5 - 2.4}{1.2/\sqrt{36}}\right)$

(C) $P\left(z < \dfrac{2.8 - 2.5}{1.2/\sqrt{36}}\right)$

(D) $P\left(z > \dfrac{2.8 - 2.4}{1.2/\sqrt{36}}\right)$

(E) $P\left(z < \dfrac{2.8 - 2.4}{1.2/\sqrt{36}}\right)$

29. Which of the following is the central limit theorem?

(A) No matter how the population is distributed, as the sample size increases, the mean of the sample means becomes closer to the mean of the population.
(B) No matter how the population is distributed, as the sample size increases, the standard deviation of the sample means becomes closer to the standard deviation of the population divided by the square root of the sample size.
(C) If the population is normally distributed, then as the sample size increases, the sampling distribution of the sample mean becomes closer to a normal distribution.
(D) All of the above together make up the central limit theorem.
(E) The central limit theorem refers to something else.

30. What is a sampling distribution?

(A) A distribution of all the statistics that can be found in a given sample
(B) A histogram, or other such visual representation, showing the distribution of a sample
(C) A normal distribution of some statistic
(D) A distribution of all the values taken by a statistic from all possible samples of a given size
(E) All of the above

31. A judge chosen at random reaches a just decision roughly 80% of the time. What is the probability that in randomly chosen cases at least two out of three judges reach a just decision?

(A) $3(.8)^2(.2)$
(B) $1 - 3(.8)^2(.2)$
(C) $(.8)^3$
(D) $1 - (.8)^3$
(E) $3(.8)^2(.2) + (.8)^3$

32. Miles per gallon versus speed (miles per hour) for a new model automobile is fitted with a least squares regression line. Following is computer output of the statistical analysis of the data.

Dependent variable: Miles per gallon

Source	*df*	Sum of Squares	Mean Square	F-ratio
Regression	1	199.34	199.34	3.79
Residual	6	315.54	5.59	

Variable	Coefficient	SE Coef	t-ratio	P
Constant	38.929	5.651	6.89	0.000
Speed	−0.2179	0.112	−1.95	0.099

R-Sq = 38.7% R-Sq(adj) = 28.5%
s = 7.252 with 8 − 2 = 6 degrees of freedom

Which of the following gives a 99% confidence interval for the slope of the regression line?

(A) $-0.2179 \pm 3.707(0.112)$
(B) $-0.2179 \pm 3.143(0.112/\sqrt{8})$
(C) $-0.2179 \pm 3.707(0.112/\sqrt{8})$
(D) $38.929 \pm 3.143(3.651/\sqrt{8})$
(E) $38.929 \pm 3.707(5.651\sqrt{8})$

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