MBA 7020 Sample Final Exam

Descriptive Measures, Confidence Intervals

Given the following sample of weight measurements (in pounds) of 25 children aged 4, answer the following questions(1 through 3):
45, 35, 30, 28, 29, 36,44, 75, 50, 40, 48, 47, 46, 46, 46, 44, 43, 42, 40, 46, 48, 48, 48, 45, 45.

1) The mean is equal to
a) 45
b) 43.76
c) 48
d) 1094

2) The sum of squared deviations of the above 25 numbers is 1946.56. The standard deviation is equal to
a) 9.006
b) 8.823
c) 81.10
d) 77.87

3) The 80^{th} percentile value is
a) 36
b) 40
c) 46
d) 47
e) 48

4) Suppose the population mean is 14 and the population standard deviation is 5. We take all possible samples of size 64 from the population, and compute the mean of each sample. The mean of the distribution of these sample means is:
a) 14
b) 1.75
c) 0.625
d) Cannot be determined from the information given.

5) Given the same sample mean and standard deviation, which of the following would result in the widest confidence interval for the population mean?
a) A 99 percent confidence interval with n = 36
b) A 99 percent confidence interval with n = 50
c) A 99 percent confidence interval with n = 100
d) All of the above confidence intervals would be the same width.

6) A random sample of 100 GSU students reveals that 55 of them believe in the existence of aliens. What is the 95% confidence interval for the proportion of GSU students that believe so? (Assume plus or minus 2 deviations corresponds to 95%).
a) 0.45 to 0.65
b) 0.50 to 0.60
c) 0.54 to 0.56
d) 0.545 to 0.555

7) If for the above problem (survey of GSU students about belief in aliens), you wish the margin of error for the 95% confidence interval to be plus or minus 3%, then approximately what sample size would you need?
a) 900
b) 1100
c) 1300
d) 1500

8) What is the 95% confidence interval for the population-mean length (in inches) of a bolt if a sample of 64 bolts shows a mean of 6 inches with a standard deviation of 0.016 inch? (Assume plus or minus 2 deviations corresponds to 95%).
a) 5.998 to 6.002
b) 5.996 to 6.004
c) 5.984 to 6.016
d) 5.968 to 6.032

9) Suppose the population mean is 24 and the population standard deviation is 6. We take many samples of 100 randomly selected observations from the population. The mean of the distribution of the sample means is:
a) 24
b) 2.4
c) 10
d) 0.60

10) Suppose the population mean is 24 and the population standard deviation is 6. We take many samples of 100 randomly selected observations from the population. The estimated standard error of the distribution of sample means is:
a) 6
b) 12
c) 0.6
d) 1.2

11) Suppose the sample mean for a set of data is 50 (sample size =36) and the sample standard deviation is 6. What is the margin of error in the 95% confidence interval for the population mean? (Assume t-value of 2 corresponds to 95%).
a) ±1
b) ±2
c) ±6
d) ±12

12) Assuming all other things are held constant, when the confidence level is increased, what happens to the margin of error?
a) It increases
b) It decreases
c) It stays the same
d) It may go either up or down, there is not enough information to decide

Regression Analysis (Chapter 11, 12)

Use the following Table to answer questions 13 through 20.

SUMMARY OUTPUT

Regression Statistics	
R Square	**13)**
Standard Error	10.00
Observations	23

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	**14)**	**16)**	4000.00	**19)**	0.0044
Residual (Error)	**15)**	**17)**	**18)**		
Total	22				

	Coefficients	*P-value*
Intercept	9.0000	0.0318
Age	0.2000	0.0301
SAT Score	0.0100	0.0410

13) R-squared is equal to:
a) 0.655
b) 0.800
c) 1.000
d) 2000
e) 0.200

14) Degrees of freedom for Regression are:
a) 0
b) 1
c) 2
d) 20
e) 21

15) Degrees of freedom for Error (Residual) are:
a) 1
b) 2
c) 20
d) 21
e) 22

16) Sum of squares for regression equals:
a) 4,000
b) 8,000
c) 16,000
d) 2,000
e) 100

17) Sum of Squares for Error equals:
a) 20
b) 50
c) 100
d) 2000
e) 4000

18) Mean Squared Error equals:
a) 5
b) 10
c) 15
d) 25
e) 100

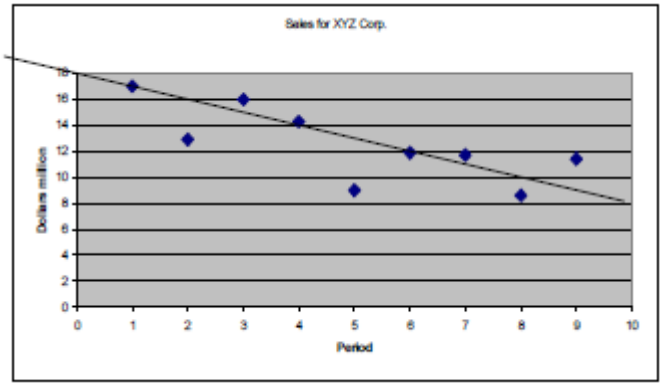
19) The F value is:
a) 0.5
b) 1
c) 40
d) 100
e) 4000

20) Predicted Y for a 20 year old with an SAT score of 1000, based on the regression equation, equals:
a) 13
b) 9.21
c) 23
d) 33
e) 27

21) The proportion of variability in Y explained by a regression model is called
a) Standard Error
b) Multicollinearity
c) R_2
d) MAPE
e) p-value

22) High correlation between the independent variables in a regression is called
a) Standard Error
b) Multicollinearity
c) R_2
d) MAPE
e) p-value

Consider the following graph of some data.



23) Which of the following equations best approximates the regression line shown?
a) y = 18x – 1
b) y = 18x – 2
c) y = 18 – 1x
d) y = 18 – 2x
e) y = 1x + 18

24) The presence of a significant interaction effect between independent variables A and B means that
a) The impact of A on the dependent is higher than the impact of B.
b) The impact of A on the dependent variable is different for different values of B.
c) Both A and B have a significant impact on the dependent variable.
d) There is multicollinearity present, and either A or B should be dropped from the model.

25) The coefficient of an independent variable in a regression is negative when you expect the relationship to be positive. This is an indication of
a) Heteroscedasticity
b) Multicollinearity
c) Negative R-Squared
d) Non-linear relationship

26) The F-value in an Anova table in the regression output is equal to
a) SSR/SST
b) SSR/SSE
c) MSE/MSR
d) MSR/MSE

27) If you perform a regression analysis with 50 observations and 3 independent variables, the number of degrees of freedom for error is
a) 49
b) 48
c) 47
d) 46
e) 45

Decision Analysis (Chapter 7)

Consider the following payoff table with alternatives A1 through A4 and states of nature S1 through S4.

	S1	S2	S3	S4
A1	25	35	10	-5
A2	36	30	11	0
A3	30	30	40	-20
A4	-10	20	30	25

28) What is the best decision alternative using the *Maximin* criterion?
a) A1
b) A2
c) A2 & 0
d) A3 & -20
e) A4

29) What is the best decision alternative using the *Laplace* criterion?
a) A1 or A4
b) A2
c) A3
d) A3 & 20

Build the opportunity loss table for the above data and answer the following questions.

	S1	S2	S3	S4
A1				
A2				
A3				
A4				

30) The best decision alternative using the *Minimax Regret* criterion is:
a) A1
b) A2
c) A3
d) A4
e) 46

Consider now that you know the probabilities of the states of nature occurring. The new data is as follows.

	S1	S2	S3	S4
A1	25	35	10	-5
A2	36	30	11	0
A3	30	30	40	-20
A4	-10	20	30	25
Prob:	0.7	0.1	0.1	0.1

31) The best decision alternative using the *Expected Value* criterion is:
a) A1
b) A2
c) A3
d) A4
e) Either A1 or A2

32) The *Expected Value Under Perfect Information* (EVUPI) is:
a) 35.2
b) 32.7
c) 5.9
d) 29.3
e) Cannot be computed with the data given.

33) The *Minimum Expected Opportunity Loss* (Minimum EOL) is:
a) 5.9
b) 9.2
c) 32.7
d) 29.3
e) Cannot be computed with the data given.

Simulation (Chapter 16)
34) A queuing system has an average arrival interval of 0.30 hours, with an exponential distribution. You are simulating it, and generate several random numbers, one of which is 0.15. Convert this random number into an appropriate arrival interval for the above system. The interval is:
a) 0.569
b) 1.20
c) 0.18
d) 1.897
e) 2.30

35) Which of the following is true?
a) A Normal distribution is a uniform distribution
b) An Inverse normal distribution is a uniform distribution.
c) A Normal distribution is symmetric about the mean.
d) A Uniform distribution is not symmetric about the mean.

Consider the following demand pattern (assume the 3 discrete levels of demand shown) for a product for the past 25 weeks. Fill in the blanks in the table and answer the questions 36 and 37.

Demand (Units)	Frequency (Weeks)	Prob	Cum Prob
			0
1000	9		
1500	5	Q36)	Q37)
2000	11		
Total	25		

36) The probability of the demand level being 1500 is:
a) 0.09
b) 0.05
c) 0.20
d) 0.56
e) 1.00

37) The cumulative probability of the demand level being 1500 or less is:
a) 0.20
b) 0.36
c) 0.18
d) 0.56
e) 1.00

Consider the following random numbers that you generated to simulate the above demand levels. For each random number, write the corresponding demand level (use the same data as in problems 12,13.) Answer questions 38-39. **Suggestion**: Draw a sketch to help you!

Random Number	Demand
0.05	Q38)
0.30	Q39)

38) The demand corresponding to the random number 0.05 is:
a) 0
b) 1000
c) 1500
d) 2000
e) 4500

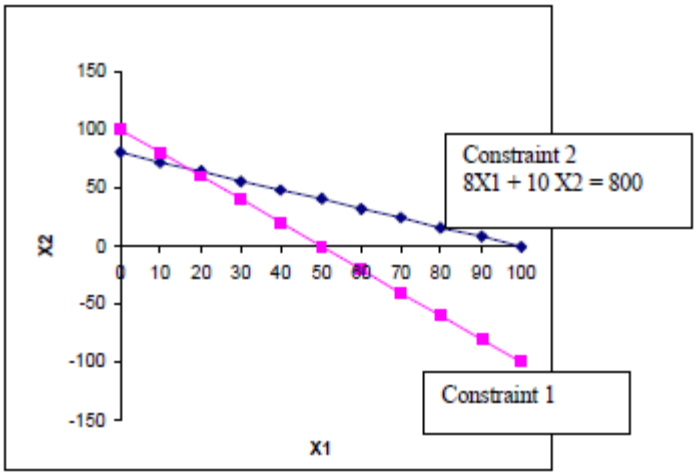
39) The demand corresponding to the random number 0.30 is:
a) 0
b) 1000
c) 1500
d) 2000
e) 4500

40) A loading dock simulation (single queue, single server) has an arrival rate of 5 per hour (average interval = 12 minutes), and a service rate of 6 per hour (average service time = 10 minutes). You now decide to study the effect of building an additional dock, all other things remaining constant. Which of the following best approximates the new situation with two docks?
a) Arrival rate doubles to 10 per hour on average per dock.
b) Arrival rate is cut in half to 2.5 per hour on average per dock.
c) Service time doubles to 20 minutes on average per dock.
d) Service rate is cut in half to 3 per hour on average per dock.

41) Which of the following statements is (are) false regarding the numbers generated by the RAND function in Excel?
a. Approximately 10% of the numbers will be between 0.0 and 1.0
b. Approximately 20% of the numbers will be between 0.50 and 0.70
c. Approximately 40% of the numbers will be between 0.20 and 0.60
d. Approximately 60% of the numbers will be between 0.15 and 0.75
e. All of the above statements are false

42) In order to generate a normally distributed random value with mean of 75 and standard deviation of 8,
a. get Excel to do this by using the formula = NORMINV (RAND(),75,8)
b. load the RandFns add-in and use the formula = NORMAL_ (75,8)
c. load the @Risk add-in and use the formula = RISKNORMAL (75,8)
d. all of the above can be used.
e. only b and c can be used.

Optimization (Chapter 14)
Consider the following graphical solution to a maximization problem. Assume both constraints are = (less than or equal to) type of constraints.



43) The equation for constraint 1 is:
a) 2X1 + X2 = 50
b) 5X1 + 10X2 = 500
c) 6X1 + 3X2 = 300
d) X1 + X2 = 50

44) The objective function is " Maximize Profit = 5X1 + X2". The optimal solution (production levels of X1, X2) is:
e) 50,0
f) 0,80
g) 16.66,66.66
h) 100,0

45) Linear programming is a subset of a larger class of models called:
a. mathematical programming models
b. mathematical optimality models
c. linear regression models
d. linear simplex models
e. none of the above

46) Related to sensitivity analysis in linear programming, when the profit increases with a unit increase in a resource, this change in profit is referred to as:
a) the add-in price
b) the sensitivity price
c) the shadow price
d) the additional profit
e) none of the above

47) Assume that a company makes wooden picture frames. Frame style 1 takes 2 hours of skilled labor and 3 linear feet of wood. If the company had 40 hours of skilled labor and 48 linear feet of wood that can be used each week, what is the largest quantity of this item that the company will be able to produce given these resource constraints?
a) 13.33
b) 16
c) 20
d) 24
e) none of the above

48) The prototype linear programming problem is to select an optimal mix of products to produce to maximize profit.This type of problem is referred to as the:
a) product mix problem
b) production problem
c) product/process problem
d) product scheduling problem
e) none of the above

49) The divisibility property of linear programming means that a solution can have both:
a) integer and noninteger levels of an activity
b) linear and nonlinear relationships
c) positive and negative values
d) revenue and cost information in the model
e) none of the above

50) When using the graphical solution method to solve linear programming problems, the set of points that satisfy all constraints is called:
a) the optimal region
b) the feasible region
c) the constrained region
d) the logical region
e) none of the above

Answers

1	b	**11**	b	**21**	c	**31**	b	**41**	a
2	a	**12**	a	**22**	b	**32**	a	**42**	d
3	e	**13**	b	**23**	c	**33**	a	**43**	c
4	a	**14**	c	**24**	b	**34**	a	**44**	a
5	a	**15**	c	**25**	b	**35**	c	**45**	a
6	a	**16**	b	**26**	d	**36**	c	**46**	c
7	b	**17**	d	**27**	d	**37**	d	**47**	b
8	b	**18**	e	**28**	b	**38**	b	**48**	a
9	a	**19**	c	**29**	c	**39**	b	**49**	a
10	c	**20**	c	**30**	b	**40**	b	**50**	b