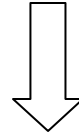


MID TERM

MSF 503 Modeling 1

Name: _____

Answers go here!



NEATNESS COUNTS!!!

Multiple Choice: 2 points each

1. **In Excel, the VLOOKUP function does what?** _____
 - a.) Searches the first row of a range of cells, and then returns a value from any cell on the same column of the range.
 - b.) Searches the last column of a range of cells, and then returns a value from any row on the same column of the range.
 - c.) Searches the first column of a range of cells, and then returns a value from any cell on the same row of the range.
 - d.) Searches the last column of a range of cells, and then returns a value from any column on the same row of the range.
 - e.) None of the above.

2. **When the number of Bernoulli trials, n , is large...** _____
 - a.) $n \cdot p$ will be normally distributed.
 - b.) The normal distribution determines the value of each random x .
 - c.) We no longer need to generate u_s .
 - d.) The probability of success p approaches the standard normal.
 - e.) None of the above.

3. **Which of the following generates a z in Excel?** _____
 - a.) $= 3 + \text{RAND}() * 4$
 - b.) $= 5 * \text{NORMSINV}() - 2$
 - c.) $= 4 + \text{NORMSINV}(\text{RAND}()) - 3$
 - d.) $= 6 + \text{NORMSINV}(\text{RAND}()) * 7$
 - e.) None of the above.

4. **If we want to look at how changing the value of an input affects the value output over a range of possible inputs, we can use...** _____
 - a.) Goal Seek
 - b.) Data Table
 - c.) VLOOKUP
 - d.) Cell Auditing
 - e.) None of the above.

5. **A model is...** _____
- a.) Reality.
 - b.) A representation.
 - c.) A forecast.
 - d.) The truth.
 - e.) None of the above.
6. **The inverse transform method for generating random numbers works because...** _____
- a.) The LCG can be programmed in VBA.
 - b.) Integration is possible.
 - c.) $f(x)$ is continuous.
 - d.) $F(x)$ is uniformly distributed.
 - e.) None of the above.
7. **The Beta parameter in the exponential distribution...** _____
- a.) Determines the probable number of arrivals per period.
 - b.) Is the variance of interarrival times.
 - c.) Is the variance of the Poisson process.
 - d.) Tells you how many arrivals will occur.
 - e.) None of the above.
8. **Generating bivariate normal random numbers means calculating...** _____
- a.) Rho ρ .
 - b.) Conditional means and variances.
 - c.) The standard deviations of x_1 and x_2 .
 - d.) Covariances.
 - e.) None of the above.
9. **In VBA, Option Explicit...** _____
- a.) Fixes the lower bound of all arrays to 0.
 - b.) Requires variable declaration before definition.
 - c.) Disallows implicit type conversion.
 - d.) Declares the default comparison method for strings.
 - e.) None of the above.

10. What does Goal Seek do? _____

- a.) Finds the optimal model parameter(s).
- b.) Shows how the outcomes will vary over a range of inputs.
- c.) Shows the maximum model output and its parameters.
- d.) Finds the model inputs that lead to a target output.
- e.) None of the above.

11. Linear interpolation is a... _____

- a.) Method for calculating unknown regression coefficients.
- b.) Method for examining known empirical distributions.
- c.) Method for forecasting unknown results in the future.
- d.) Method for finding unknown points between known ones.
- e.) None of the above.

12. Any Excel or VBA function that returns an array requires... _____

- a.) Ctrl + Alt + Enter.
- b.) An input parameter of type variant.
- c.) The Range().Offset() syntax.
- d.) Absolute cell referencing.
- e.) None of the above.

13. According to the CAPM, the market risk premium is: _____

- a.) The population standard deviation of log returns of the market.
- b.) The expected return of the market minus the risk free rate.
- c.) The sample standard deviation of log returns of the market.
- d.) The expected return of the market minus the expected return on a stock.
- e.) None of the above.

14. From the CAPM, the Beta of a stock (or a portfolio of stocks)... _____

- a.) Is the correlation of the stock with the market.
- b.) Is the covariance of the stock with the market.
- c.) Is the slope of the stock with the market.
- d.) Is the intercept of the stock with the market.
- e.) None of the above.

15. **Cross-sectional normalizing _____, whereas time series normalizing _____.**
(Pick 2 answers.)

- a.) Compares data from many stocks at a point in time.
- b.) Compares data from a single stock across time.
- c.) Compares data from the market to a single stock.
- d.) Compares data from the market to a portfolio of stocks.
- e.) None of the above.

16. **Excel forces definition of:** _____

- 1. Calculations
- 2. Input and output data
- 3. GUI requirements

- a.) 1, 2, and 3.
- b.) 1.
- c.) 2, and 3.
- d.) 1, and 3.
- e.) None of the above.

17. **Prototyping should always focus on...** _____

- a.) The hardest parts first.
- b.) Object oriented design considerations.
- c.) The final design up front.
- d.) The parts that will be the easiest to solve first.
- e.) None of the above.

18. **What is a prototype spreadsheet?** _____

- a.) Something to be destroyed.
- b.) A test version.
- c.) An implementation tool.
- d.) The optimal architecture.
- e.) None of the above.

19. **The oracle problem refers to which?** _____

- a.) How do you know your spreadsheet is right?
- b.) Methods of software testing.
- c.) Code inspections and walkthroughs.
- d.) Categories of spreadsheet errors.
- e.) None of the above.

20. Spreadsheet testing should consume how much development time? _____

- a.) 4-5 hours per spreadsheet.
- b.) 25-40% of the total.
- c.) 10-20% of the total programming time.
- d.) 1-2 hours per spreadsheet.
- e.) None of the above.

Problems: 5 points each

21. Write a VBA *function* that will put normal (i.e. $N(\mu, \sigma^2)$) random numbers into a column of n number of cells. Assume you have a function `rand_norms()` that returns a z_s .

22. Use the inverse transform method (i.e. no VBA or Excel code) to generate a - random number between 4 and 5 from the following density using $u_s = .512$:

$$f(x) = .0064x^3 \quad 0 \leq x \leq 5$$

23. Write a VBA *function* to generate a random x given the following empirical - data:

i	x_i	$n_{x(i)}$
1	13	83
2	9	62
3	17	139
4	11	94

Next, generate a random number from this function using $u_s = .734$.

24. Write a VBA *function* that uses the Linear Congruential Generator to pick a random numbers from the array of cells shown (with equal probabilities for all). -

	A	B	C
1	3	5	1
2	17	4	6
3	7	11	22
4	3	2	63

25. Given the following time series data: -

	A
1	Raw Data
2	.50
3	-.23
4	.45
5	1.90
6	-.36

and difference bins of 0-.10, .11-.50, .51-∞, calculate the ranked data scores.

26. If the probability of failure is .4, and the probability of success is .3, then how many successes and failures does the following set of u_s 's generate?
 $u_s = \{ .189, .832, .561, .432, .671, .483, .022, .705, .913 \}$ -

Write a VBA *function* that generates u_s 's returns the number of successes and failures in n such trials.

27. Given the following information: $\mu_1 = 2$, $\mu_2 = 5$, $\sigma_1 = 1$, $\sigma_2 = 3$, and $\rho_{1,2} = .5$. Generate z_1 and z_2 given $z_{s(1)} = .485$ and $z_{s(2)} = -.705$. —

Essay: 15 points

28. What is meant by the terms spreadsheet *errors*, spreadsheet *best practices* and spreadsheet *testing*? Use specific examples from the readings to demonstrate your knowledge of these concepts.

