BUS 902

Preliminary Mathematics/Statistics Exam:

NOTE: This quiz is only for information purposes and will NOT be used as part of the examination component.

Be sure to provide the following information on your answer sheet:

a) Your name; b) The course which was taken to satisfy the mathematical and statistical prerequisite for this course; c) If you are a college or international transfer student, indicate the school which you previously attended.

1) Evaluate by providing a numerical solution or simplify the expression where possible, otherwise expand the summation or formula listing all relevant terms:

$$a) \sum_{t=0}^{10} t \qquad b) \ln\{\exp[a]\} = \log_e\{e^a\}$$

$$c) \sum_{i=1}^{3} \sigma_i^2 X_i^2 + 2\sum_{i>j} X_i X_j \sigma_{ij} \qquad d) \sum_{j=1}^{3}\sum_{i=1}^{3} X_i X_j \sigma_{ij}$$

$$e) \exp[a]/\exp[bx] = e^a / e^{bx} \qquad f) (x+y)^3$$

$$g) \ln(1+x) \text{ for } x \text{ small } (\text{How small is small?})$$

2) Differentiate the function y with respect to the variable x, i.e., evaluate dy/dx:

$$a) y = \frac{1}{(1+x)^n} \qquad b) y = \sum_{t=1}^{T} \frac{1}{(1+x)^t}$$

$$c) y = \ln[x] \qquad d) y = \exp[ax] = e^{ax}$$

3) Provide definitions (mathematical expressions or equations where possible) for the following terms:
a) sample mean (average) b) sample variance c) sample covariance
d) var(A + B) ---the variance of a linear combination of two random variables (A and B)
e) var(cA - B) --- where c is a constant and A and B are random variables
f) correlation coefficient for A and B-- in terms of covariance and standard deviations

4) Simplify the following expressions by re-expressing the series as a ratio:

$$a) 1 + x + x^2 + x^3 + x^4 + \ldots\ldots \text{ for } |x| < 1 \qquad b) \sum_{t=1}^{T} \frac{1}{(1+r)^t}$$