BUS 419
Preliminary Mathematics/Statistics Exam:

NOTE: This assignment is only for information purposes and the grade will NOT be used as part of the assignment component. If you cannot answer a question because the material is unfamiliar, leave a blank answer. Failure to submit the assignment will affect the assignment component of the assessment.

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. If you are a SFU student indicate the instructor(s) who taught your math/stat. prerequisite course(s) and your BUS 316 instructor.

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

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

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

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

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

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

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

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

3) Totally differentiate y where x and z are variables, and all other letters are parameters:

$$a)\ y = ax^3+bz^4 \qquad b)\ y = x^a z^b \qquad c)\ y = (a+bx)/(c+dz+ez^2)$$

3) Provide definitions (mathematical expressions or equations where possible) for the following terms:
a) sample mean (average) b) sample variance c) sample covariance d) Taylor Series Expansion e) cumulative normal distribution f) normal density function g) bond duration h) bond convexity i) the delta of a call option j) the gamma of a put option e) the vega of a currency option

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

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