SIMON FRASER UNIVERSITY
Faculty of Business Administration

BUS 411
Preliminary Mathematics/Statistics/Finance/Accounting Quiz

NOTE: This quiz is only for **participation** purposes and will NOT be marked as an examination component. However, failure to make a good faith effort in answering the questions may affect the value assigned for the participation component of the assessment.

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

a) Your name; b) The courses which were taken to satisfy the finance, mathematics and statistics prerequisites for this course; c) If these courses were not taken at SFU, indicate the school which you previously attended. If you are an SFU student indicate the instructor(s) who taught your finance, math and statistics prerequisite course(s). It is OK to say 'don't remember' if the course was taken many semesters ago.

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1) **Finance**: Provide definitions (mathematical expressions or equations where relevant) **and indicate whether the concept was covered in BUS 315**:

a) capital asset pricing model
b) bond indenture c) bond duration d) bond convexity
e) debenture f) debt covenant g) credit risk h) default risk i) BB+ credit rating
j) defined benefit pension plan k) defined contribution pension plan
l) bankers' acceptance m) commercial paper n) treasury bill

2) **Pre-calculus:** Evaluate by providing a numerical solution or simplify the expression where possible, otherwise expand the summation or formula listing all relevant terms:

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

$$c) \quad \sum_{i=1}^{3} \sigma_i^2 X_i^2 + 2 \sum_{i=1}^{3} \sum_{j=1;\, i \neq j}^{3} X_i X_j \sigma_{ij} = \sum_{j=1}^{3} \sum_{k=1}^{3} X_j X_k \sigma_{jk}$$

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

$$f) \quad \ln[1 + x] \text{ for } x \text{ small} \quad (\text{How small is small?})$$

3) **Calculus I:** Differentiate the function $y[x]$ with respect to the variable x, i.e., evaluate dy/dx:

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

$$c)\quad y = \ln[x] \qquad d)\ y = \frac{1}{x} - \frac{1}{x(1 + x)^T}$$

4) **Real Analysis:** Provide definitions (mathematical expressions or equations where possible)
a) sequence and series b) geometric series c) uniform convergence d) Taylor series expansion

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

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

Use the answer for *i*) to solve for the price of a perpetuity

5) **Statistics**: Provide definitions (mathematical expressions or equations where possible) for the following terms:
a) sample mean (average) b) sample variance c) sample covariance d) population mean
e) expected value of the random variable X, $E[X]$ f) population standard deviation
g) cumulative normal distribution function h) standard normal density function