

SIMON FRASER UNIVERSITY
Faculty of Business Administration

BUS 809/810
Preliminary Mathematics/Statistics/Finance/Accounting Quiz

NOTE: This quiz is only for information purposes and will NOT be used as part of the examination component. However, failure to make a good faith effort in answering the questions may affect 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 mathematical and statistical prerequisites for this course; c) 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).

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

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

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

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

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

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

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

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

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

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

4) Provide definitions (mathematical expressions or equations where possible) for the following terms:

a) sample covariance b) stochastic differential equation c) Ito's Lemma d) Taylor Series Expansion
e) capital asset pricing model f) security market line 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

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

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

6) Explain the difference between: a) accrual basis and cash basis accounting; b) percentage-of-completion and completed contracts method of revenue recognition; c) cash flow from operations and free cash flow; d) primary earnings per share and fully diluted earnings per share.

7) Explain briefly how each of the following transactions would affect a company's balance sheet, income statement and cash flow statement: a) purchase of a new building for \$1 million internal cash; b) purchase of a new \$1 million building, financed 60% with debt and 40% with cash; c) receipt of a \$100,000 payment from a customer on an account receivable; d) repurchase of \$10 million in company stock using internal cash.