

BUS 419/492
Preliminary Mathematics/Statistics Assignment

NOTE: This assignment is only for information purposes. The results of the assignment only count toward the class participation score. The only consequence from a failure to submit the assignment is a reduction in the participation component of the overall grade 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).

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

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

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

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

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

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

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

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

3) Provide definitions (mathematical expressions or equations where possible) for the following terms: a) sample mean (average); b) sample variance; c) sample covariance; d) $\text{var}(A + B)$ ---the variance of a linear combination of two random variables (A and B); e) $\text{var}(cA - B)$ --- where c is a constant; f) correlation coefficient for A and B-- in terms of covariance and standard deviations; g) capital asset pricing model h) bond duration i) bond convexity; j) the delta of a call option k) the gamma of a put option l) the vega of a currency option

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

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