CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

Course	**Number**		**Section(s)**
Mathematics	208/4		All
Examination	**Date**	**Time**	**Pages**
Midterm	February 2012	1 Hour 30 minutes	2
Instructors			**Course Examiner**
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FORMULAE:

$$A = P(1+i)^n, \quad A = Pe^{rt}, \quad FV = PMT\,\frac{(1+i)^n - 1}{i}, \quad PV = PMT\,\frac{1-(1+i)^{-n}}{i}$$

Special Instructions:

- ▷ Answer all questions.
- ▷ **Only approved calculators are allowed.**

MARKS

[10] **1.** Given the quadratic function $f(x) = 0.20x^2 - 1.6x - 1$

(A) Find x and y intercepts algebraically.

(B) Find the vertex form of f.

(C) Find the vertex and the maximum or minimum.

(D) Find the range of f.

[10] **2.** Solve for x in the following equations:

(A) $6^{x^2+1} = 36^{-x}$

(B) $3^{2x} = \dfrac{1}{27}$

(C) $\log_{10}(x+6) - \log_{10}(x-3) = 1$

(D) $\log_3(9x) - \log_3(x-8) = 4$

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[10] **3.**

(A) If the first term of an arithmetic sequence is 203 and the 30th term of the sequence is 261, find the sum of the first 1000 terms.

(B) If the first term of a geometric sequence is 300 and the third term is 3, find the sum of the first 25 terms.

[10] **4.** A radio commercial for a loan company states: "You only pay \$0.29 a day for each \$500 borrowed." If you borrow \$1,500 for 120 days, what amount will you repay, and what annual interest rate is the company actually charging?

[10] **5.** A company establishes a sinking fund for plant retooling in 6 years at an estimated cost of $\$850,000$.

(A) How much should be invested semiannually into an account paying 8.76% compounded semiannually?

(B) How much interest will the account earn in the 6 years?

[10] **6.** A family has a $\$50,000$, 20-year mortgage at 7.2% compounded monthly.

(A) Find the monthly payment and the total interest paid.

(B) Suppose the family decides to add an extra \$100 to its mortgage payment each month starting with the very first payment. How long will it take the family to pay off the mortgage?