CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

Course	Number		Section(s)
Mathematics	208/2		All
Examination	**Date**	**Time**	**Pages**
Midterm	October 2017	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

[3+4+3] **1.** Given the function $f(x) = -0.4x^2 + 3.2x - 6$

(A) Find x and y intercepts algebraically;

(B) Find the vertex form of f;

(C) What value of x will maximize or minimize $y = f(x)$ and what is the range of f?

[2.5 × 4] **2.** Solve for x in the following equations:

(A) $16(8^{x-3})^x = 2^{4x}$

(B) $\log_2(1+x) = 2 + \frac{1}{3}\log_2 27$

(C) $2017^{7x^2-40x+30} = 2017^{2x^2+3(3x-2)}$

(D) $\ln(2x+1) + \ln(x-2) = \ln(4x-7)$

PLEASE TURN OVER

[5+5] **3.** (A) If the 13^{th} and 37^{th} terms of an arithmetic sequence are -49 and -121, respectively, find the 669^{th} term of the sequence.

(B) The sum and the first term of an infinite geometric series are 2 and 3, respectively, find the 7^{th} term of the series.

[10+5] **4.** Donald makes his first \$1,700 deposit into an IRA earning 6.2% compounded annually on his 24th birthday and his last \$1,700 deposit on his 38th birthday (15 equal deposits in all). With no additional deposits, the money in the IRA continues to earn 6.2% interest compounded annually until Donald retires on his 65th birthday.

(A) How much is in the IRA when Donald retires?

(B) How much interest is earned during the last five years before retirement?

[5+5+5] **5.** A family buys a house for \$875,000 with a down payment of \$175,000. They take out a 30 year mortgage for \$700,000 at an annual interest rate of 5.1% compounded monthly.

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

(B) Find the unpaid balance after 15 and 25 years.

(C) Suppose the family decides to add an extra \$100 to its mortgage payment each month starting with the very first payment. How many months will it take to pay off the mortgage (round the answer to the nearest integer)? How much interest will the family save?