

CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

Course	Number	Section(s)	
Mathematics	208/4	All	
Examination	Date	Time	Pages
Midterm	February 2013	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

[4+3+3] 1. Given the quadratic function $f(x) = 1.2 - 0.96x - 0.12x^2$

- (A) Find x and y intercepts algebraically.
- (B) Find the vertex form of f .
- (C) Find the vertex and the maximum or minimum.

[$2\frac{1}{2} * 4$] 2. Solve for x in the following equations:

- (A) $4^{2x^2+2x} = 8$
- (B) $\ln(x - 3) + \ln(x - 2) = \ln(2x + 24)$
- (C) $e^{-2x^2+x-5} = \left(\frac{1}{e}\right)^{x^2-3x+20}$
- (D) $2^{\log_7 x} = 2^3$

PLEASE TURN OVER

[5+5] 3.

(A) Find the sum of the first twenty terms of an arithmetic sequence

5, 4.5, 4, 3.5, 3, 2.5,

(B) If the first and 4th terms of a geometric sequence are $\frac{1}{64}$ and $-\frac{1}{8}$, respectively, find the 8th term of the sequence.

[5+5] 4.

(A) Which is the better investment and why: 8% compounded quarterly or 8.3% compounded annually?

(B) What is the annual nominal rate compounded quarterly for a bond that has an Annual Percentage Yield of 5.8%?

[5+5] 5. Raul Vasquez, a 25-year old professional, puts \$750 in a retirement fund at the end of each quarter until he reaches age 60. The account pays 8% interest compounded quarterly.

(A) How much will be in the account when he is 60?

(B) If Raul makes no further deposits after age 60, how much will he have for retirement at age 65?

[5+5] 6. The Rechten family buys a house for \$140,000 with a down payment of \$30,000. The family take out a 30 year mortgage for \$110,000 at 6.6% compounded monthly.

(A) Find the amount of the monthly payment needed to amortize this loan.

(B) Find the the part of the first payment that is interest and the part that is applied to reducing the debt.