CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

Course	**Number**		**Section(s)**
Mathematics	206/4		All
Examination	**Date**	**Time**	**Pages**
Midterm	March 2015	1 Hour 30 minutes	2
Instructors			**Course Examiner**
A. Bellahnid, K. Duelund, K. Kefalas, S. Dey			D. Sen

Special Instructions

▷ **Only approved calculators are allowed.**

MARKS

[4] **1.** Simplify the expressions below. Do not use a calculator.

(a) $(\sqrt{5}-1)^2$ (b) $2\sqrt{48}-3\sqrt{27}$

[4] **2.** Rationalize the denominator:

(a) $\dfrac{24}{4\sqrt{2}}$ (b) $\dfrac{\sqrt{3}+1}{\sqrt{3}-1}$

[6] **3.** Simplify the expressions:

(a) $(3x^4+x^2+x)+2x(5x^3-x^2+3x^2)$ (b) $\dfrac{x^2-2x}{3x-6}$

[8] **4.** Factor the polynomials completely:

(a) $3x^2-10x-8$ (b) x^4-x^3+x-1

[3] **5.** Use synthetic division to determine whether $x+3$ is a factor of x^5-4x^3+x.

[6] **6.** Solve the equations:

(a) $x(2x-3)=(2x+1)(x-4)$ (b) $4x^2+2x-1=0$ (c) $\sqrt{x^2-x-4}=x+2$

PLEASE TURN OVER

[6] **7.** Solve the inequalities, express your answer using set notation or interval notation:

(a) $9 - 3|2x - 5| > 0$ (b) $3x + 4 > \frac{1}{3}(x - 2)$

[4] **8.** (a) Write an equation of a line that is perpendicular to the line $y = \frac{1}{2} + 4$ and passing through $(1, -2)$.

(b) Write the standard form of the equation of the circle $x^2+y^2+4x-6y+12 = 0$. Find the center and radius of the circle.

[4] **9.** Find the domain of the functions (do not graph):

(a) $f(x) = \sqrt{(x - 1)}$ (b) $g(x) = \frac{x}{x^2 - 9}$

[5] **10.** Sketch the graph of the function $f(x) = (x + 2)^2 - 3$, starting from the graph of the function $g(x) = x^2$.