

CONCORDIA UNIVERSITY  
Department of Mathematics & Statistics

Course	Number	Date	Time	Section(s)
Mathematics	206/2			All
Examination				Pages
Midterm	November 2015	1 Hour 30 minutes		2
Instructors				Course Examiner
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Special Instructions

- ▷ Only approved calculators are allowed.

MARKS

- [4] 1. Simplify the expressions below. Do not use a calculator.
- (a)  $(4\sqrt{2} - 3)^2$       (b)  $5\sqrt{12} - 4\sqrt{75} + 2\sqrt{48}$
- [4] 2. Rationalize the denominator:
- (a)  $\frac{20}{2\sqrt{3} + \sqrt{7}}$       (b)  $\frac{3 + \sqrt{2}}{3 - \sqrt{2}}$
- [6] 3. Simplify the expressions:
- (a)  $(3x^4 + x^2 + x) + 2x(6x^4 - 2x^3 + 5x^2)$       (b)  $\frac{4x}{x^3 - 4x} + \frac{1}{x - 2}$
- [8] 4. Factor the polynomials completely:
- (a)  $3x^2 + 3x - 18$       (b)  $2x^5 - 32x$
- [3] 5. Use synthetic division to determine whether  $x + 3$  is a factor of  $3x^5 + 2x^4 - 20x + 24$ .
- [6] 6. Solve the equations:
- (a)  $2x^2 - 2x - 1 = 0$       (b)  $9x(x - 2) = 2x(3x - 7) + 15$       (c)  $\sqrt{2x + 5} - 1 = x - 6$

PLEASE TURN OVER

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

(a)  $-5 \leq \frac{3x-4}{2} < 7$

(b)  $2 \leq |x+4| - 5$

[4] 8. (a) Write an equation of the line parallel to  $2x + 5y - 1 = 0$ , passing through the point  $(-10, 1)$ .

(b) Write the equation of a circle with center at  $(-3, 4)$  and radius 6.

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

(a)  $f(x) = \sqrt{12 - 2x}$

(b)  $g(x) = \frac{3x-1}{x^2 - 2x - 24}$

[5] 10. Sketch the graph of the function  $f(x) = (x+3)^2 - 1$ , starting from the graph of the function  $g(x) = x^2$ .