

CONCORDIA UNIVERSITY  
Department of Mathematics & Statistics

| Course                                                       | Number       | Section(s)        |                 |
|--------------------------------------------------------------|--------------|-------------------|-----------------|
| Mathematics                                                  | 206/2        | All               |                 |
| Examination                                                  | Date         | Time              | Pages           |
| Midterm                                                      | October 2014 | 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)  $(7 - 3\sqrt{3})^2$  (b)  $4\sqrt{24} - 2\sqrt{72}$

- [4] 2. Rationalize the denominator:

(a)  $\frac{5}{3\sqrt{2}}$  (b)  $\frac{\sqrt{2}}{\sqrt{3} - 3\sqrt{2}}$

- [6] 3. Simplify the expressions:

(a)  $4x(3x^4 - 4x^3 + 6x^2 - 1) - 2x^2(x^2 - 4x + 3)$  (b)  $\frac{3x}{x-4} + \frac{2x}{x+3}$

- [8] 4. Factor the polynomials completely:

(a)  $3x^2 - 2x - 8$  (b)  $64 - 27x^3$

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

$$-4x^3 + 5x^2 + 8$$

- [6] 6. Solve the equations:

(a)  $2(3 + 2x) = 3(x - 4)$  (b)  $2x^2 - x - 3 = 0$  (c)  $\sqrt{12 - x} = x$

PLEASE TURN OVER

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

(a)  $|-x - 2| \geq 1$       (b)  $x + 8 < \frac{1}{2}(x - 4)$

- [4] 8. (a) Write an equation of a line that is perpendicular to the line  $X = 2$  and passing through  $(3, 4)$ .

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

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

(a)  $f(x) = \sqrt{16 - x^2}$       (b)  $g(x) = \frac{x}{\sqrt{x - 3}}$

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