

CONCORDIA UNIVERSITY
Department of Mathematics & Statistics

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|--|-----------------|-------------------|-------|
| Course | Number | Section(s) | |
| Mathematics | 206/2 | All | |
| Examination | Date | Time | 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 $g(x) = x^2$.