

CARLETON UNIVERSITY

FINAL EXAMINATION
MATH 1004 A, B, C, D, E, F
December

DURATION: 3 HOURS

Department Name and Course Number: School of Mathematics and Statistics,
MATH 1004 A, B, C, D, E, F.

Course Instructor(s): Dr. A.B. Mingarelli (Sect. A), Dr. Y. Gao (Sect. B), Mr. M. Blenkinsop (Sect. C, D), Dr. B. Brimacombe (Sect. E), Dr. Z. Montazeri (Sect. F).

AUTHORIZED MEMORANDA
NON-PROGRAMMABLE CALCULATOR PERMITTED.
BLANK SHEETS OF PAPER PROVIDED BY THE UNIVERSITY

This exam may be released to the Library and may be taken away by the student.

1. Please verify that you are in possession of a Scantron FORM
2. Please **fill in your COURSE CODE** (e.g., MATH 1004) and **COURSE SECTION** (e.g., A, B, C, D, E, F), **YOUR NAME** and **YOUR STUDENT NUMBER** where required on the Scantron form.
3. **The examination consists of two sheets of legal size paper.** It is out of a total of 100 and consists of 25 multiple choice questions each worth 4 marks **Please fill in only one answer on your Scantron sheets with a pencil** as there is only one answer to any given question. Circling two or more answers to any question invalidates that question (*i.e.*, you get 0 marks for that question).

Return only the duly completed Scantron form, not the examination nor your work.

1. [4 marks] Let $f(x) = |x - 1| + |x - 3|$. Calculate $L = \lim_{h \rightarrow 0^+} \frac{f(1+h) - f(3)}{h}$.
(a) $L = 0$ (b) $L = 1$ (c) $L = -1$ (d) This limit does not exist
2. [4 marks] Let $f(x) = \frac{1 - \cos x}{x^2}$, for $x \neq 0$, and $f(x) = A$, for $x = 0$. What value of A will make f continuous at $x = 0$?
(a) $A = 0$ (b) $A = 1/2$ (c) $A = -1$ (d) $A = 1$.
3. [4 marks] Evaluate $L = \lim_{x \rightarrow 3} \frac{x^2 - 2x - 3}{x^2 - 9}$.
(a) $L = 0$ (b) $L = \frac{3}{2}$ (c) $L = \frac{2}{3}$ (d) This limit does not exist
4. [4 marks] Let $f(x) = \frac{\sin(3x)}{\sin(2x)}$. Evaluate $L = \lim_{x \rightarrow 0} f(x)$.
(a) $L = 0$ (b) $L = \frac{3}{2}$ (c) $L = \frac{2}{3}$ (d) This limit does not exist
5. [4 marks] Two functions f, g are defined by $f(x) = 3x^2$ and $g(x) = \cos x$. What is the value of their composition $f(g(0))$?
(a) -3 (b) 3 (c) -3.2 (d) 0