



Examination
Quiz 3
Winter 2019
CS 105

Please print in pen:

Waterloo Student ID Number:

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WatIAM/Quest Login Userid:

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Times: Wednesday 2019-01-02 at 09:00 to 11:30

Duration: 2 hours 30 minutes (150 minutes)

Exam ID: 4023377

Sections: CS 105 LEC 001

Instructors: Daniel Vogel

Question	1	2	3	4	5	6	7	8	9	10	Total
Points	10	10	10	10	10	10	10	10	10	10	100

Instructions

1. This instruction area on the cover page will be seen by students. Change or add any instructions you like. Or, change the content of this area to something else. The following items are only suggestions and will not apply in every case.
2. Print your UWaterloo username, name and ID number at the top of this page.
3. Check for questions on both sides of each page.
4. Answer the questions in the spaces provided. If you require additional space to answer a question, please use the second last page and refer to this page in your solutions. You may tear off the last page to use for rough work.
5. Do not write on the Crowdmark QR code at the top of each page.
6. Use a dark pencil or pen for your work.
7. Answer multiple choice and true-false questions on the bubble page, the last page of the test.

..... Last line on cover page. Space below this line is used by Odyssey for page numbers.

Please initial:

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Second page. Some sample questions.

- [4] 1. Suppose that $\mathbf{F} = \nabla \times \mathbf{G}$, for some vector field \mathbf{G} , where $\mathbf{G} = (G_1, G_2, G_3)$, $G_i : \mathbb{R}^3 \rightarrow \mathbb{R}$ and $G_i \in \mathcal{C}^2$, $i = 1, 2, 3$. Show that $\nabla \cdot \mathbf{F} = 0$.

- [4] 2. Let $\mathbf{F} = \frac{\mathbf{r}}{r^4}$, where $\mathbf{r} = (x, y, z)$ and $r = \|\mathbf{r}\| = \sqrt{x^2 + y^2 + z^2}$. Compute $\nabla \cdot \mathbf{F}$.

Alternative statements to students about blank pages in their answer books:

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This page intentionally left blank for scratch paper. Return it with your test.

This page is for rough work and will not be graded.

Extra pages for answers. Please specify the question number here and the use of this page on the question page.

Please initial: