

UNIVERSITY OF TORONTO
Faculty of Arts and Science

Midterm 1
CSC165H1S

Duration: 50 minutes
Instructor(s): David Liu, Toniann Pitassi
No Aids Allowed

Name:

Student Number:

Please read the following guidelines carefully!

- Please write your name on both the front and back of this exam.
 - This examination has 4 questions. There are a total of 8 pages, **DOUBLE-SIDED**.
 - Answer questions clearly and completely, with justifications unless explicitly asked not to.
 - Unless stated otherwise, your formulas can use *only* the propositional connectives and quantifiers we have seen in class, arithmetic operators (like $+$, \times , and exponentiation), comparison operators (like $=$ and $>$), and the divisibility and *Prime* predicates. You may not define your own sets or predicates unless asked to do so.
 - All formulas must have negations applied directly to propositional variables or predicates (e.g., $\neg \text{Prime}(n)$). You do *not* need to show your work for computing negations.
 - In your proofs, you may always use definitions of predicates. You may *not* use any external facts about rates of growth, divisibility, primes, or greatest common divisor unless you prove them, or they are given to you in the question.
 - You may **not** use induction for your proofs on this midterm.
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Take a deep breath.

This is your chance to show us

How much you've learned.

We **WANT** to give you the credit

That you've earned.

A number does not define you.

Good luck!

1. [**2 marks**] Here is question 1.

2. [**2 marks**] Here is question 2.

3. [**3 marks**] Here is question 3.

4. **[4 marks]** Here is a multi-page question.

Question 4 continued...

Use this page for rough work. If you want work on this page to be marked, please indicate this clearly *at the location of the original question*.

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Name:

Question	Grade	Out of
Q1		2
Q2		2
Q3		3
Q4		4
Total		11