



UNIVERSITY OF TORONTO
Faculty of Arts and Science

Midterm 1
CSC165H1S

Duration: 50 minutes
Instructor(s): David Liu, Toniann Pitassi

No Aids Allowed

midterm1 35-1

Name: *page 3 upside down & scratched out page 6*

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.
-

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!



midterm 1035-265H1S , Winter 2017

Midterm 1

1. [2 marks] Here is question 1.

m

3. [3 marks] Here is question 3.

5

2. [2 marks] Here is question 2.





midterm 1035465H1S , Winter 2017

Midterm 1

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

5



CSC165H1S , Winter 2017

Midterm1 35-5

Question 4 continued...

5



midterm 10356, Winter 2017

Midterm 1

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.*

A blue ink mark consisting of a vertical line with a small loop at the top, positioned in the middle right area of the page.



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.*

e



midterm 1035-85H1S , Winter 2017

Midterm 1

Name:

m

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