

## Math 301: Introduction to Proofs

Problem Set 1  
due: February 4, 2019

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**Read.** Preface, Introduction, §1.1, §1.2, §1.3, §1.4

### Exercises.

§1.2 | 3, 5(b), 6(b), 12, 15

**Exercise 1.** In this exercise we'll learn about Pierce's law, a curiosity of classical logic. Later we'll revisit this in another guise, but for now we use the tools we know.

(a) Apply a *DeMorgan law* and a *Double Negation law* to reduce the expression

$$\neg(\neg P \vee Q) \vee P$$

(b) Using truth tables, show that your reduced expression is *logically equivalent* to  $P$ . Where did  $Q$  go?

### Exercises.

§1.3 | 1, 4, 8

### Exercises.

§1.4 | 6, 7, 8, 10

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