# MATH 115: ELEMENTARY NUMBER THEORY
# HOMEWORK # 7

JOHN VOIGHT

*Homework* #7 (Due August 9):

- §8.1: 2, 4, 7;
  8.1A: The following ciphertext was generated using a simple substitution algorithm:
  ```
  53ddc305))6*;4826)4d.)4d);806*;48c8p60))85;;]8*;:d*8c83
  (88)5*c;46(;88*96*?;8)*d(;485);5*c2:*d(;4956*2(5*-4)8p8*
  ;4069285);)6c8)4dd;1(d9;48081;8:8d1;48c85;4)485c528806*81
  (d9;48;(88;4(d?34;48)4d;161;:188;d?;
  ```
  Decrypt the message.

  *[Hints: The most frequently occurring letter in English is* e. *Therefore, the first or second (or perhaps third?) most common character in the message is likely to stand for* e. *Also* e *is often seen in pairs. Try to find a character in the ciphertext that decodes to* e. *The most common word in English is* the. *Use this fact to guess the characters that stand for* t *and* h. *Decipher the rest of the message by deducing additional words.]*
- §8.4: 2, 3, 4, 8
- §4.6: 1(c)
- §11.1: 2(a)–2(c), 5, 7, 10, 12, 27
- §11.2: 1(a)–1(b), 3, 4