Exercise 4.1

1. Does 17 divide each of these numbers?

a) 68

9. What are the quotient and remainder when

a) 19 is divided by 7?

29. Decide whether each of these integers is congruent to 5 modulo 17.

a) 80

Exercise 4.2

1. Convert the decimal expansion of each of these integers to a binary expansion.

a) 231

5. Convert the octal expansion of each of these integers to a

binary expansion.

a) (572)8

21. Find the sum and the product of each of these pairs of numbers. Express your answers as a binary expansion.

a) (100 0111)2, (111 0111)2

Exercise 4.3

1. Determine whether each of these integers is prime.

a) 21

5. Find the prime factorization of 10!.

17. Determine whether the integers in each of these sets are pairwise relatively prime.

b) 14, 15, 21

25. What are the greatest common divisors of these pairs of

integers?

a) 37 · 53 · 73, 211 · 35 · 59

27. What is the least common multiple of each pair in Exercise 25?

a) 37 · 53 · 73, 211 · 35 · 59

Exercise 4.6

5. Decrypt these messages encrypted using the shift cipher f (p) = (p + 10) mod 26.

a) CEBBOXNOB XYG