Worksheet 4.2 & 4.3 - Integer Representation and Algorithms and Primes and Greatest Common Divisors

1. Add $(10111)_2$ and $(11010)_2$.

2. Multiply $(1110)_2$ and $(1010)_2$.

3. Determine whether each of these integers is prime

   (a) 19

   (b) 27

   (c) 93

   (d) 101

4. Determine whether the integers in each of these sets is pairwise relatively prime.

   (a) 11, 15, 19

   (b) 14, 15, 21

   (c) 12, 17, 31, 37

   (d) 7, 8, 9, 11

5. What are the greatest common divisors and least common multiple of these pairs of integers?

   (a) $3^7 \cdot 5^3 \cdot 7^3$, $2^{11} \cdot 3^5 \cdot 5^9$

   (b) $11 \cdot 13 \cdot 17$, $2^9 \cdot 3^7 \cdot 5^5 \cdot 7^3$

   (c) 23^{31}, 23^{17}

   (d) $41 \cdot 43 \cdot 53$, $41 \cdot 43 \cdot 53$

   (e) $3^{13} \cdot 5^{17}$, $2^{12} \cdot 7^{21}$

   (f) 1111, 0

6. Use the Euclidean algorithm to find

   (a) $\gcd(1, 5)$.

   (b) $\gcd(123, 277)$.

   (c) $\gcd(1529, 14038)$.

   (d) $\gcd(100, 101)$.

   (e) $\gcd(1529, 14039)$.

   (f) $\gcd(11111, 111111)$.