答案僅供參考

第 1 題.

1 (a) $789 = 34 \cdot 23 + 7$ quotient is 34

remainder is 7

1 (b) $-202 = -3 \times 87 + 59$ quotient is -3

remainder is 59

第 2 題.

2. (a) $101 = 5 \times 17 + 16$

(b) $-112 = -7 \times 17 + 7$ both are not congruent to 5 modulo 17.

第 3 題.

3. $X_0 = 2$

$X_1 = 3 \times 2 \bmod 11 = 6$ sequence:

$X_2 = 3 \cdot 6 \bmod 11 = 7$ $2, 6, 7, 10, 8, 2, \ldots$

$X_3 = 3 \cdot 7 \bmod 11 = 10$

$X_4 = 3 \cdot 10 \bmod 11 = 8$

$X_5 = 3 \cdot 8 \bmod 11 = 2$

⋮

第 4 題.

(a) $627 = 3 \times 11 \times 19$

(b) $9099 = 3^3 \times 337$

答案僅供參考

第5題.

(a) $12 = 2^2 \times 3$

17 Each of element doesn't have same prime factorization,

31 the set is pairwise relatively prime.

$35 = 5 \times 7$

(b) 7

$8 = 2^3$ The set is pairwise relatively prime.

19

$111 = 3 \cdot 37$

第6題.

(a) $\gcd(3^7 \cdot 5^3 \cdot 7^3, 2^7, 3^3 \cdot 5^9) = 3^3 \cdot 5^3 = 3375$

(b) $111 = 3 \cdot 37$

$99 = 3^2 \cdot 11$

$\gcd(111, 99) = 3$

第7題.

$233 = 144 + 89$

$144 = 89 \cdot 1 + 55$

$89 = 55 \cdot 1 + 34$

$55 = 34 \cdot 1 + 21$

$34 = 21 \cdot 1 + 13$

$21 = 13 \cdot 1 + 8$

$13 = 8 \cdot 1 + 5$

$8 = 5 + 3$

$5 = 3 + 2$

$3 = 2 + 1$

$1 = 3 - 2 = 3 - (5-3) = 2(8-5) - 5 = -3 \cdot 13 + 5(21-13$

$= 5 \cdot 21 - 8(34-21) = -8 \cdot 34 + 13(55-34)$

$= 13 \cdot 55 - 21(89-55) = -21 \cdot 89 + 34(144-89)$

$= 34 \cdot 144 - 55(233-144) = 89 \cdot 144 - 55 \cdot 233$

inverse of 144 modulo 233 is 89

第 8題.

8、 $x = (2\cdot 3\cdot 5\cdot 11)k + y, = 330k+y.$

$x \equiv 1 \pmod 2$

$x \equiv 2 \pmod 3$ $11\times 4+4=48$, $11\times 14+4=128$, $11\times 24+4=268$

$x \equiv 3 \pmod 5$ $11\times 9+4=103$, $11\times 19+4=213$, $\underline{11\times 29+4=323}$

$x \equiv 4 \pmod{11}$

A: $330k+323$ #

第 9題.

follow question 7.

$1 = -55\cdot 89 + 34\cdot 144$

第 10題.

Since a|c and b|d, then we have c = as and d = bt for some s and t.

Multiplying we have cd = ab(st), which means ab|cd.