

# 第一章课后习题

P48: 习题 (6), (11), (17), (18), (32), (33)

(6) 之证明: ①  $\lfloor \sqrt{191} \rfloor = 13$ : 2, 3, 5, 7, 11, 13 都不能整除 191  
故 191 为素数

②  $\lfloor \sqrt{549} \rfloor = 24$ : 同理, 549 为素数.

③  $\lfloor \sqrt{737} \rfloor = 28$ : 2, 3, 5, 7, 11 | 737, 故为合数

④  $\lfloor \sqrt{747} \rfloor = 28$ : 2, 3 | 747, 故为合数.

(11) Eratosthenes 筛出 500 以内全部素数.

$\lfloor \sqrt{500} \rfloor = 22$  依次去掉 22 以内素数的倍数即可.

(17)  $\begin{array}{c} (1111 \ 0001 \ 1110 \ 101)_2 \\ \hline 8421 \qquad \qquad \qquad 8421 \\ \hline \end{array} \rightarrow (78F5)_{16}$

$(10111110 \ 1001110)_2 \rightarrow (2F4E)_{16}$

(18)  $(9A0AB)_{16} \rightarrow (1001 \ 1010 \ 0000 \ 1010 \ 101)_2$

$(9)_{16} \rightarrow (1001)_2$

$(A)_{16} \rightarrow (1010)_2$

$(0)_{16} \rightarrow (0000)_2$

$(B)_{16} \rightarrow (1011)_2$

(32) 使用定义区组里得求  $s, t$ , 使  $sa + tb = (a, b) \rightarrow$  上表格!

①  $(1613, 3569)$

② ③ ④ 略

$j$	$s_j$	$t_j$	$q_{j+1}$	$r_{j+1}$
-3				3569
-2	1	0		1613
-1	0	1	2	363
0	1	-2	4	161
1	-4	9	2	41
2	9	-20	3	38
3	-31	69	1	3

$$\begin{array}{ccccc} 4 & 40 & -89 & 12 & 2 \\ 5 & -511 & 1137 & 1 & 1 \\ 6 & 551 & -1226 & 2 & 0 \end{array}$$

$$\therefore \text{得 } \gcd(1613, 3589) = 551 \times 3589 - 1226 \times 1613 = 1$$

这个结果, 先用  $(a, b) = (b, c)$  算出来再  
回推算的, 何其恐怖的工作量!

(23) ①  $(7, 10, 15)$

$$\therefore (7, 10) = (10, 7) = (7, 3) = (3, 1) = 1 = 7 - 2 \times 3 = 7 - 2 \times (10 - 7) = 3 \times 7 - 2 \times 10$$

$$(1, 15) = 1 = 15 - 14 \times 1$$

$$\therefore (7, 10, 15) = 1 = 15 - 14 \times (3 \times 7 - 2 \times 10) = -42 \times 7 + 28 \times 10 + 1 \times 15$$

对于3个数的求逆, 不是唯一的!

②  $(70, 98, 105)$

$$\therefore (70, 98) = (98, 70) = (70, 28) = (28, 14) = 14$$

$$= 70 - 28 \times 2$$

$$= 70 - (98 - 70) \times 2$$

$$= 3 \times 70 - 2 \times 98$$

$$(105, 14) = (14, 7) = 7 = 105 - 14 \times 7 = 105 - 7 \times (3 \times 70 - 2 \times 98)$$

$$= 105 - 2 \times 70 + 14 \times 98$$

③ 略.