1.2 Base 7
0, 1, 2, 3, 4, 5, 6, 10, 11, 12, 13, 14, 15, 16, 20
Base 9
0, 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15

1.3 (1) one's complement
(a) 10010 ----> 01101
(b) 110010 ----> 001101
(c) 0010101 ---> 1101010
(d) 10110.0101 ---> 01001.1010
(e) 1101.1100 ---> 0010.0011
(f) 111010.0011 ---> 000101.1100
(g) 1001.0001 ---> 0110.1110
(h) 110100.0100 ---> 001011.1011
(i) 1010110.111 ---> 0101001.000

(2) two's complement
(a) 10010 ---> 01101 <--- complement each bit
+ 1 <--- add 1 to the LSB
01110
(b) 110010 ---> 001101 + 1 = 001110
(c) 0010101 ---> 1101010 + 1 = 1101011
(d) 10110.0101 ---> 01001.1010 + 1 = 01001.1011
(e) 1101.1100 ---> 0010.0011 + 1 = 0010.0100
(f) 111010.0011 ---> 000101.1100 + 1 = 000101.1101
(g) 1001.0001 ---> 0110.1110 + 1 = 0110.1111
(h) 110100.0100 ---> 001011.1011 + 1 = 001011.1100
(i) 1010110.111 ---> 0101001.000 + 1 = 0101001.001

1.4 nine's complement
(a)465
$(465)_9 = 10^3-(465)_{10}-1 = 534$
(b)09867
$09867)_9 = 10^5-(09867)_{10}-1 = 90132$
(c)42678
$(42678)_9 = 10^5-(42678)_{10}-1 = 57321$
(d)8976
$(8976)_9 = 10^4-(8976)_{10}-1 = 1023$
(e)423.76
$(423.76)_9 = 10^3-(423.76)_{10}-0.01 = 576.23$
(f)561.876
$(561.876)_9 = 10^3-(561.876)_{10}-0.001 = 438.123$
(g)463.90
$(463.90)_9 = 10^3-(463.90)_{10}-0.01 = 536.09$
(h)1786.967
$(1786.967)_9 = 10^4-(1786.967)_{10}-0.001 = 8213.032$
(i)12356.078
$(12356.078)_9 = 10^5-(12356.078)_{10}-0.001 = 87643.921$

Ten's complement
(a)$(465)_{10} = 10^3-(465)_{10} = 535$
(b)$(09867)_{10} = 10^5-(09867)_{10} = 90133$
(c)$(42678)_{10} = 10^5-(42678)_{10} = 57322$
(d)$(8976)_{10} = 10^4-(8976)_{10} = 1024$
(e)$(423.76)_{10} = 10^3-(423.76)_{10} = 576.24$
(f)$(561.876)_{10} = 10^3-(561.876)_{10} = 438.124$
(g)$(463.90)_{10} = 10^3-(463.90)_{10} = 536.10$
(h)$(1786.967)_{10} = 10^4-(1786.967)_{10} = 8213.033$
(i)$(12356.078)_{10} = 10^5-(12356.078)_{10} = 87643.922$

1.5 (a) x+y
$$\begin{array}{r} 1101010 \\ +\ 10111 \\ \hline 10000001 \end{array}$$

x-y
$$\begin{array}{r} 1101010 \\ -\ 10111 \\ \hline 1010011 \end{array}$$

xxy
$$\begin{array}{r} 1101010 \\ \times\ 10111 \\ \hline 1101010 \\ 1101010 \\ 1101010 \\ 0000000 \\ 1101010 \\ \hline 100110000110 \end{array}$$

x/y
$$\begin{array}{r} 1101010 \\ -10111 \\ \hline 00111 \\ -\ 10111 \\ \hline 01110 \\ -\ 10111 \\ \hline 1110 \\ 100 \end{array}$$

11010 > 10111 $q_1 = 1$;subtract
00111 < 10111 $q_2 = 0$;do not subtract
01110 < 10111 $q_3 = 0$;do not subtract
← remainder
← quotient

(b) x+y
$$\begin{array}{r} 101101 \\ +\ 1111 \\ \hline 111100 \end{array}$$

x-y
$$\begin{array}{r} 101101 \\ -\ 1111 \\ \hline 11110 \end{array}$$

xxy
$$\begin{array}{r} 101101 \\ \times\ 1111 \\ \hline 101101 \\ 101101 \\ 101101 \\ 101101 \\ \hline 1010100011 \end{array}$$

x/y
$$\begin{array}{r} 101101 \\ -1111 \\ \hline 10110 \\ -\ 1111 \\ \hline 1111 \\ -\ 1111 \\ \hline 0 \\ 011 \end{array}$$

1011 < 1111 $q_1 = 0$;do not subtract
10110 > 1111 $q_2 = 1$;subtract
1111 ≥ 1111 $q_3 = 1$;subtract
← remainder
← quotient