3.1 n = slot (starting at 0)

a) $6^{n} \quad 6^{4} + 6^{3} + 6^{2} + 6^{1} + 6^{0}$

1296	216	36	6	1

$6^4 = 1296$
$6^3 = 216$
$6^2 = 36$
$6^1 = 6$
$6^0 = 1$

b) $24531_6 = 2\times6^4 + 4\times6^3 + 5\times6^2 + 3\times6^1 + 1\times6^0$

$2\times1296 + 4\times216 + 5\times36 + 3\times6 + 1\times1$

$2592 + 864 + 180 + 18 + 1 = \boxed{3655}$

3.2

16^3	16^2	16^1	16^0
4096	256	16	1
2^{12}	2^8	2^4	2^0

2^4

$16^3 = 4096 \quad 2^{12}$
$16^2 = 256 \quad 2^8 = 4$
$16^1 = 16 \quad 2^4 = 2$
$16^0 = 1 \quad 2^0 = 1$

3.3 a) $4E \rightarrow$

4	14
16×4	16^0

$(4\times16^1) + (14\times16^0)$

$64 + 14 = 78$

$= 78$

$15 + 40$

b)

3	13	7

$(3\times16^2) + (13\times16^1) + (7\times16^0)$

$768 + 208 + 7$

$= 983$

$+256$
75
768

3×4096
12288

$\times 13$
18
78
$+130$
208

$\times 256$
18
768
2560
3328

4×28
112
$+0$

c)

3	13	7	0
3	13	7	0×16^0

$(3\times16^3) + (13\times16^2) + (7\times16^1) + (0\times16^0)$

$(3\times4096) + (13\times256) + (7\times16) + (0\times1)$

$12288 + 3328 + 112 + 0 = \boxed{15,728}$

3.7

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	10
2	0	2	4	6	8	A	C	E	10	12	14	16	18	1A	1C	1E	20
3	0	3	6	9	C	F	12	15	18	1B	1E	21	24	27	2A	2D	30
4	0	4	8	C	10	14	18	1C	20	24	28	2C	30	34	38	3C	40
5	0	5	A	F	14	19	1E	23	28	2D	32	37	3C	41	46	4B	50
6	0	6	C	12	18	1E	24	2A	30	36	3C	42	48	4E	54	5A	60
7	0	7	E	15	1C	23	2A	31	38	3F	46	4D	54	5B	62	69	70
8	0	8	10	18	20	28	30	38	40	48	50	58	60	68	70	78	80
9	0	9	12	1B	24	2D	36	3F	48	51	5A	63	6C	75	7E	87	90
A	0	A	14	1E	28	32	3C	46	50	5A	64	6E	78	82	8C	96	A0
B	0	B	16	21	2C	37	42	4D	58	63	6E	79	84	8F	9A	A5	B0
C	0	C	18	24	30	3C	48	54	60	6C	78	84	90	9C	A8	B4	CD
D	0	D	1A	27	34	41	4E	5B	68	75	82	8F	9C	A9	B6	C3	D0
E	0	E	1C	2A	38	46	54	62	70	7E	8C	9A	A8	B6	C4	D2	E0
F	0	F	1E	2D	3C	4B	5A	69	78	87	96	A5	B4	C3	D2	E1	F0
10	0	10	20	30	40	50	60	70	80	90	A0	B0	C0	D0	E0	F0	100

27 = 16 + 11

28 = 16 + 12 32 35 = 32 + 3

30 = 16 + 14 36 = 32 + 4

49 31

3.7 b) 2AB3 + 35DC = 8F8F

2AB3 + 35DC = 601F ✓

c) 1FF9 + F7 = 20F0 ✓

d) 2E26 × 4 = 1607C + B8980 = DFCEC

3.8 a) 10110101 + 10011011 = 100000000

b) 11011111 + 11011111 = 110111110

c) 11010011 + 10001010 = 101011101

d) 1101 + 1011 + 101 + 1100 = 100011

e) a) (0001)(0110)(1101) + (0000)(1001)(1011) = 16D0 + 09B = 208 → (0010)(0000)(1000)

b) (0001)(1011)(1111) → 1BF + 1BF = 37E → (0011)(0111)(1110)

3.8 c) (1101)(0011) → D3
(1000)(1010) → 8A
150 → (0001)(0101)(1101)

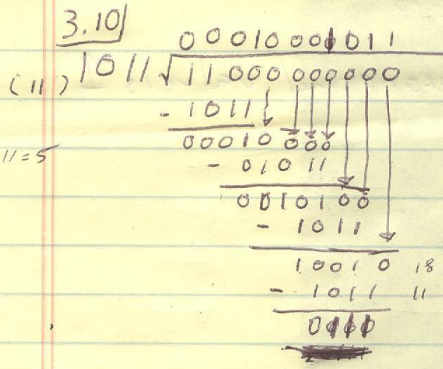
d) (1101) → D
(1010) → A
(0111) → 7
(0101) → 5
17
C
(2)(3) → (0010)(0011)

3.9 a)
1101
× 10.1
000101
+ 010100
+ 101000
1000001

b)
11011
× 1011
1011
+ 10110
+ 1011000
+ 10110000
100101001

3.10 a) (6) 110 √1101 0001001 000
000 1101100.000 Remainder 1 (I don't think you can have a fraction of a bit)
- 0110
0 1000
- 0110
0010 01
- 0110
0110
110
- 110
000

3.10



16-11=5

OOPS → 3.111$_{8=1}$ 6026

$8^1 = 8$

$8^2 = 64$

$8^3 = 512$

$8^4 = 4096$

$6\times8^3 + 0\times8^2 + 2\times8^1 + 6\times8^0$

$6\times512 + 0 + 2\times8 + 6\times1$

$3072 + 0 + 16 + 6$

$3072 + 22$

3094

3.16 a) (1011)(1010)(1011)(1010)

5 A B A → 5BBA

b) (1111)(1111)(1111)(0001)

F F F 1 → FFF1

c) (0001)(1111)(1110)(1111)

1 F E F → 1FEF

d) (0110)(0011)(0001)(1001)

6 3 1 9 → 6319

3.17 a) (0100)(1111)(0110)(1010)

b) 9902

1001 1001 0000 0010

c) A3AB

1010 0011 1010 1011

d) 1000

0001 0000 0000 0000

3.25 a)

.6640625

.6640625 × 16

3.9843750

+ 6.6406250

10.6250000 → 10 = A

.62500 × 16 =

10.00000 → 10 = A → .AA

b) .3333

× 16

1.9998

+ 3.3330

5.3328 → 5

.3328

× 16

1.9968

+ 3.3280

5.3148 → 5

.3148

× 16

1.8858

+ 3.1480

5.0338 → 5

.0338

× 16

+ .2028

+ .3380

.5408 → 0

☆

2 4
.5408
× 16
3.2448
+ 54080
8.6528 → 8

3 1 4
.6528
16
3.9168
+ 65280
10.44448 → A

2 2 4
.4448
× 16
2.6688
+ 44480
7.1168 → 7

1108
× 16

.5550 determined to be irrational, Because You can never get rid of the 8

C. 69/256

00.269531125
256 ⟌ 69.000000000
- 512
1780
- 1536
2440
- 2304
1360
- 1280
0800
- 768
320
- 256
640
- 512
1280
- 1280
0000

23
256
× 5
1280

256

1 4 5 3 1 13
.269531125
× 16
1,617 18750
+ 2,69531250
4.31250000 → 4

13
.3125
× 11,16
1.8750
+ 3.1250
5.0000 → 5

→ .451

3.26

a) $.1001001_2 = 73 \quad = .73/128_{or\ 2^7} = .5703125$

b) $0.3A2_{16}$

$(0011)(1010)(0010) + .1110100010_2 =$

$512 + 256 + 128 + 32 + 2 = 930/16^3 \text{ or } 930/4096 = .2270507813$

c) $.2A1$

$0010\ 1010\ 0001$

$512 + 128 + 32 + 1 = 673/1728 = .3894675926$

3.27

a) $27.625 = 27$

512	256	128	64	32	16	8	4	2	1
0	0	0	0	0	1	1	0	1	1
1	0	0	1	1	1	0	0	0	1

$27.625 \cdot 2^3 \text{ or } 8 = 22/\text{or } 11011.0$

b) 4192.37761

131072	65,536	32,768	16,384	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1
0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0
				1	0	0	0	0	0	1	0	1	0	0	0	0	0

$4192.37761 * 2^5 \text{ or } 32 = 134156.08352$

$1000001100000.0000010100000_2$