Midterm Problem #6

a) 49.1875_{10}

$49_{10} + 0.1875_{10}$

49/2 → 1
24/2 → 0
12/2 → 0
6/2 → 0
3/2 → 1
1/2 → 1.

$0.1875 \times 2^5 = 6$
6/2 → 0
3/2 → 1
1/2 → 1

110001.0011_2

$49_{10} + 0.1875_{10}$

49/8 → 1
6/8 → 6

$0.1875 \times 8^5 = 6144$
6144/8 → 0
768/8 → 0
96/8 → 0
12/8 → 4
1/8 → 1

61.14_8

$49_{10} + 0.1875_{10}$
49/16 → 1
3/16 → 3

$0.1875 \times 16^5 = 196608$
196608/16 → 0
12288/16 → 0
768/16 → 0
48/16 → 0
3/16 → 3

31.3_{16}

3.074218875_{10}

$312 \rightarrow 1$
$112 \rightarrow 1$

$0.7421875 \times 16 = 1.1875$
$.1875 \cdot 16 = 3$
$0.07421875_{10} = 0.13_{10}$

$0011.00010011\,0$
$3 \quad 0 \quad 4\,6$

$3.07421875_{10} = 11,00010011_2$
$= 313_{16}$
$= 3.046_8$

0.2_{10}

$0.0011\,0011\,0011\,0011\,0011\,\ldots$
$1 \quad 4 \quad 6 \quad 3 \quad 1 \quad 4$ Repeats

$0.2_{10} = 0.3_{16}$
$= 0.0011_2$
$= 0.1463_8$

$49.1875_{10} \rightarrow 110001.0011_2 \cdot 2^6$

$0.110001\,0011$

0110

0	110	0010	0110	0000	0000	0000	0000	0110
	6	2	6	0	0	0	0	6

626000 06

$3.07421875_{10} \rightarrow 11.0001\,0011_2$

$0.11\,0001\,0011 \cdot 2^2$

0110	0010	0110	0000	0000	0000	0000	0010
6	2	6	0	0	0	0	2

626000 02

$0.2_{10} = 0.\overline{0011}_2 \times 2^{-2}$

$0.\overline{1100}_2$

0.110 | 0100 | 0100 | 0100 | 0100 | 0100 | 0100

6 6 6 6 6 6

0000 0010
1111 1101 flip
add one
1111 1110
F E

666666 FE

b) $-49.1875_{10} = 110001.0011_2$

001110.1100

$+1$

001110.1101

$= 1110.1101_2$

$= E.D_{16}$

$= 16.15_8$

1110.1101×2^4

0.11101101

0111 | 0110 | 1000 | 0000 | 0000 | 0000 | 0000 | 0100

7 6 8 0 0 0 0 4

768000 04

$-3.07421875 = 11.0001\ 0011$

$00.1110\ 1100$ +1

$00.1110\ 1101_2$

$= 0.1110\ 1101_2$

$= 0.ED_{16}$

$= 0.732_8$

$.E\ D_{16}$

$.\ \cancel{16.15_8}$

$0.1110\ 1101_2$

0.111	0110	1000	0000	0000	0000	0000	0000
7	6	8	0	0	0	0	0

Nasa 768000 00

$-0.2 = 0.\overline{0011}$

1.1100 +1

1.1101_2

$1.1101\ 1101\ 1101\ 1101$

1.1101	1101	1101	1101
1	D	D	D

1.1101_{16}

1.110	111	011	101	110	111
6	7	3	5	6	7

1.6735_8

$= 1.1101_2$

1.6735_8

$1.D_{16}$

Nasa

$-0.2_{10} = 1.1101_2 \times 2^1$

0.1110_1

1.0001_0

1.0010_{+1}

0.1110 | 1101 | 1101 | 1101 | 1101

0.111 | 0111 | 0111 | 0111 | 0111 | 0111 | 0000 | 0001

7 7 7 7 7 7 0 1

7777701

c) 6499902

0.110 | 1001 | 1001 | 1001 | 1001 | 1001 | 0000 | 0010

11.0100 1100 1100 1100

4 C C

3.4CC

$3 \times 16^0 + 4 \times 16^{-1} + 12 \times 16^{-2}$ = 3.296875$_{10}$

6999999 03

Same as last but plus 1 character power

110.1001 | 1001 | 1001 | 1001

6 . 9 9 9 9

$6.999_{16} = 6 \times 16^{0} + 9 \times 16^{-1} = 6.5625_{2}$

96667F7F

1001 | 0110 | 0110 | 0110 | 0110 | 0111 | 1111 | 1111

9 6 6 6 6 7

2^{-1}

$-.096667$

$9 \times 16^{-2} + 6 \times 16^{-3} + 6 \times 16^{-4} + 6 \times 16^{-5} + 6 \times 16^{-6} + 7 \times 16^{-7}$

$= -0.036747_{10}$