NASA Format

1) 37.25

Decimal → Binary

37

37/2 = 18 r1
18/2 = 9 r0
9/2 = 4 r1
4/2 = 2 r0
2/2 = 1 r0
1/2 = 0 r1

$= 100101_2$

.25

.25 · 2 = .5 → next bit 0
.5 · 2 = 1 → next bit 1

$.25_{10} = .01_2$

$37.25_{10} = 100101.01_2$

Normalize: $.10010101_2 \cdot 2^6$

↑ Store after this

+6 → binary 0000 0110 → hex 06

Mantissa bits (24): 00101010000000000000000

Group by 4: 0010 = 2
1010 = A
0000 x 4 = 0000

→ $2A\ 00\ 00_{16} + 06 = 2A\ 00\ 00\ 06$

2) .2

Decimal → Binary

value · 2	integer bit
.2 · 2 = .4	0
.4 · 2 = .8	0
.8 · 2 = 1.6	1
.6 · 2 = 1.2	1

$.2_{10} = .0011\ 0011\ 0011\ \ldots_2$

e = -2 → binary 1111110 → hex FE

Normalize:

$.0011\ 0011\ldots_2$

e = -2

-2

$.11\ 0011\ 0011\ \ldots \cdot 2$

Drop Store

1001100110011001100110011001 → hex 99 99 99 + FE = 99 99 99 FE