Problem #6: Conversion:

a) 2.875 & 0.1796875 from base 10 to 2, 8, 16

Base 2

$2.875_{10} \rightarrow ?_2 \rightarrow 2.875_{10} \rightarrow \boxed{10.111_2}$

0010_2

10.111_2

$.875 \times 2 = 1.75 \rightarrow 1$

$.75 \times 2 = 1.50 \rightarrow 1$

$.50 \times 2 = 1.00 \rightarrow 1$

$.0 \times 2 = 0 \rightarrow 0$

Base 8

$2.875_{10} \rightarrow 10.111_2 \rightarrow \boxed{2.7_8}$

$2._{10} = 2_8$

$.111_2 = .7_8$

Base 16

$2.875_{10} \rightarrow 10.111_2 \rightarrow ?_{16} \rightarrow \boxed{2.E_{16}}$

0010.1110

$2 \quad . \quad E$

Base 2:

$0.1796875_{10} \rightarrow ?_2 \rightarrow \boxed{0.00101110_2}$

$0_{10} = 0_2$

$.1796875 \times 2 = 0.359375 \rightarrow 0$
$.359375 \times 2 = 0.71875 \rightarrow 0$
$.71875 \times 2 = 1.4375 \rightarrow 1$
$.4375 \times 2 = 0.875 \rightarrow 0$
$.875 \times 2 = 1.75 \rightarrow 1$
$.75 \times 2 = 1.50 \rightarrow 1$
$.50 \times 2 = 1.00 \rightarrow 1$
$.00 \times 2 = 0 \rightarrow 0$

Base 8

$0.1796875_{10} \rightarrow 0.00101110_2 \rightarrow ?_8 \rightarrow \boxed{0.134_8}$

0.00101110^{*}

$0.1\ 3\ 4$

*a zero was added for triplet conversion.

Base 16

$0.1796875_{10} \rightarrow 0.00101110_2 \rightarrow ?_{16} \rightarrow \boxed{0.2E_{16}}$

0.00101110

$0.\ 2\ E$

59999901 NASA FORMAT HEX → ?$_{10}$

0.101

1001 1001	1001 1001	1001 1001	0000 0001
5 9	9 9	9 9	0 1

positive. positive.

$0.10110011001100110011001 \times 2^{1}$

$1.01100110011001100110011001$

integer part = 1.

fractional part = $2^{-2} + 2^{-3} + 2^{-6} + 2^{-7} + 2^{-10} + 2^{-11} + 2^{-14} + 2^{-15} + 2^{-18} + 2^{-19} + 2^{-22}$

.25+ .375 .390625

etcetera... added on calculator...

1.39999857_{10}

59999902 NASA FORMAT Hex → $?_{10}$

0.1011001 | 10011001 | 10011001 | 00000010

5 9 9 9 9 9 0 2

positive positive

$0.10110011001100110011001 \times 2^2$

$10.11001100110011001100101$

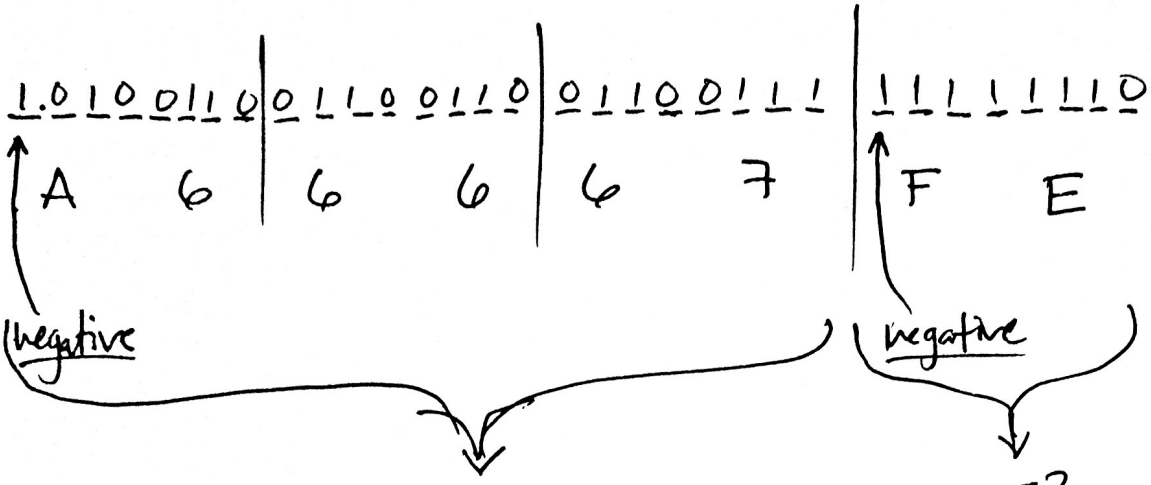
integer part = 2.

fractional part $= 2^{-1}+2^{-2}+2^{-5}+2^{-6}+2^{-9}+2^{-10}+2^{-13}+2^{-14}+2^{-17}+2^{-18}+2^{-21}$

0.5 + .75 + .78125 + etcetera... added on calculator.

2.799999714_{10}

A6666 7FE NASA FORMAT Hex → ?10



$-1.01\,0011\,0011\,0011\,0011\,0111 \times 2^{-2}$

$-101.0011\,0011\,0011\,0011\,0111$

integer part = -5.

fractional Part = $2^{-3}+2^{-4}+2^{-7}+2^{-8}+2^{-11}+2^{-12}+2^{-15}+2^{-16}+2^{-19}+2^{-20}+2^{-21}$

-5.200000286_{10}