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CSC17A Lehr

NASA format

a) 49.1875_{10}

$49_{10} \rightarrow base_{16}$

$49/16 = 3.0$ R1

$= \underline{3} \times 16^1 + \underline{1} \times 16^0 = 49_{10} = 31_{16}$

$0.1875_{10} \rightarrow base\ 16$

$0.1875 \times 16 = 3.0$

$\rightarrow 0.3_{16}$

$49.1875_{10} = \boxed{31.3_{16}}$

$31.3_{16} \rightarrow base_2$

$\boxed{0011\ 0001.0011_2}$

$00\ 11\ \ 00\ 01.\ 00\ 11 \rightarrow base\ 8$

$\boxed{6\ \ 1\ .\ 1\ 4_8}$

cont. →

110001.0011_2

$6 \rightarrow 0000\ 0110$

$0.110001\,0011 \times 2^6$

0.1100010|01100000|00000000|00000110

C 2 6 0 0 0 0 6

a_2) 3.07421875_{10}

$3_{10} \rightarrow$ base 16

$= \underline{0} \times 16^1 + \underline{3} \times 16^0 = 3_{10} = 3_{16}$

$0.07421875_{10} \rightarrow$ base 16

$0.07421875_{10} \times 16 = \underline{1}.1875$

$0.1875 \times 16 = \underline{3}.0$

$3.07421875_{10} = \boxed{3.13_{16}}$

$3.13_{16} \rightarrow$ base 2

$\boxed{0011.0001\ 0011_2} \rightarrow$ base 8

0011 . 0001 0011 00

$\boxed{3.046_8}$

$0011.0001\ 0011_2$

0.1100010011×2^2 $2 \rightarrow 0000\ 0010$

0.110 0010 | 0110 0000 | 0000 0000 | 0000 0010

6 2 6 0 0 0 0 2

q_3) $0.2_{10} \rightarrow$ base 16

$0.2 \times 16 = 3.2$

$0.2 \times 16 = 3.2$

⋮

$0.2_{10} = \boxed{0.\underline{3}_{16}}$

$0.\ 3\ 3\ 3\ 3\ 3 \ldots\ldots \rightarrow$ base 2

$0000.0011\ 0011\ 0011\ 0011\ 0011 \ldots$

$\boxed{= 0.\underline{0011}_2} \rightarrow$ base 8

$.001\ 100\ 110\ 011\ 001\ 100\ 110\ 011$

$.\ 1\ \ 4\ \ 6\ \ 3\ \ 1\ \ 4\ \ 6\ \ 3 \ldots_8$

$= \boxed{0.\underline{1463}_8}$

$.\underline{00}11\ 0011\ 0011\ 0011\ 0011 \ldots$

$0.1100110011001100 \ldots \times 2^{-2}$

$0000\ 0010$

$+\ 1111\ 1101$

$1111\ 1110$

$0.\underline{1}1\underline{0}0\underline{1}1\underline{0}\,|\,\underline{0}1\underline{1}0\underline{0}\underline{1}\,|\,\underline{1}0\underline{1}\underline{0}\,|\,\underline{0}1\underline{1}0\underline{0}\underline{1}1\underline{0}\,|\,\underline{1}1\underline{1}1\underline{1}1\underline{1}0$

6 6 6 6 6 6 F E

b.) $-49.1875_{10} = -31.3_{16}$

$= -61.14_8$

110001.0011_2

flip

001110.1100

$+ \qquad\qquad\qquad 1$

001110.1101_2

0.11101101×2^{4} → 0000 0100

0.11101101 00000000 00000000 00000100

7 6 8 0 0 0 0 4

b₂) $-3.07421875_{10} = \boxed{-3.13_{16}}$

$= \boxed{-3.046_8}$

$11.0001\ 0011_2$

flip

$00.1110\ 1100$

$+\qquad\qquad\qquad\quad 1$

$\boxed{0.1110\ 1101_2}$

$0.1110\ 1101 \times 2^0$

0 1111011010000000 00000000 00000000

7 6 8 0 0 0 0 0

b3) $-0.2_{10} = -0.\underline{3}_{16}$

$= -0.1463_8$

0. 0011 0011 0011 0011 ....

1. 1100 11 00 1100 1100 ....

~~0. 1110 0110 0110 0 1100 1100 ... × 2^1~~

1. 1100 1100 1100 1100 . 110 0 . 1 + one ...

\+ 1

1. 1100 1100 1100 1100 110 1 00 ....

0. 1110 0110 0110 0 ... × 2^1

0. 1 1 1 0 0 1 1, 0 0 1 1 0 0 1 1, 0 0 1 1 0 1 0 0, 0 0 0 0 0 0 0 1

7 3 3 3 3 4 0 1

C.) 6 9 9 9 9 9 0 2

$\times 2^2$

0.110 1001 1001 1001 1001 1001 | 0000 0010

$11.0\ 1001_2$

0011.0 1001 1001 1001 1001 1001 1001

3 . 2 3 1 4 6 3 1 4

3.23146_8

3 . 4 C C C C

$3.4C_{16}$

$(3 \times 16^0) . (4 \times 16^{-1}) + (12 \times 16^{-2}) + (12 \times 16^{-3}) \cdots$

$3. \frac{4}{16} + \frac{12}{16^2} + \frac{12}{16^3} = 3.29_{10} \rightarrow 3.3_{10}$

(2) 6 9 9 9 9 9 0 3

0.110 1001 1001 1001 1001 1001 | 0000 0011

0110. 1001 1001 1001 1001 1001 ... $_2$

6 . 9 9 9 9 9 $_{16}$

$0110.\underline{1001}_2$

$= 6.\underline{9}_{16}$

6 . 4 6 3 1 4 6 3_8

~~6.46314~~

$6.\underline{4631}_8$

$6\times16^0 + (9\times16^{-1}) + (9\times16^{-2}) + (9\times16^{-3}) \ldots$

$6 . \frac{9}{16} + \frac{9}{16^2} + \frac{9}{16^3} \cdots = 6.59_{10} \rightarrow 6.6_{10}$

(3) 9 6 6 6 7 FF

1111 1111
− 1
1111 1110

0000 0001 $\times 2^{-1}$

1.001 0110 0110 0110 0110 0111 $\times 2^{-1}$

0.1001 0110 0110 0110 0110 0111
− 1

0.1001 0110 0110 0110 0110 0110

0001. 0110 1001 1001 1001 1001 1001 = 1.0110 1001 $\times 2^{0}$

1 . 6 9 9 9 ...

1.6 9 $_{16}$

1.323146 $_{8}$

1.6 9 $_{16}$ → base 10

$(1\times16^{0}).(6\times16^{-1}) + (9\times16^{-2}) + (9\times16^{-3})\ldots$

1.4125 $_{10}$