

49.1875, 3.07421875, 0.2

binary, octal, hex

49.1875
a) hex: $16 \overline{) 49} \begin{matrix} 3 \text{ R1} \\ 0 \text{ R3} \end{matrix}$ $0.1875 \cdot 16 = 3$
 $\begin{array}{r} 49 \\ -48 \\ \hline 1 \end{array}$

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

binary: $3 \quad 1 \quad . \quad 3$
 $0011 \ 0001 \ . \ 0011$

$$49.1875_{10} = 00110001.0011_2$$

octal $\boxed{110} \boxed{001} . \boxed{001} \boxed{100}_2$
 $6 \quad 1 \quad , \quad 1 \quad 4$

$$49.1875_{10} = 61.14_8$$

$\underbrace{11000}_6 . 0011 \quad 6 = 00000110$

Nasa format $011000100110000000000000000000110$

b) Nasa format negative

$$\begin{array}{r} 011000100110000000000000 \\ 1001101100111111111111 \\ + \\ \hline 100110110100000000000000 \end{array}$$

-49.1875_{10} in nasa format $100110110100000000000000000000110$

3.07421875

a) hex

$$\begin{array}{r} 0 \text{ A3} \\ 16 \overline{) 3} \end{array} \quad \begin{array}{l} 0.07421875 \cdot 16 = 1.1875 \\ 0.1875 \cdot 16 = 3 \end{array}$$

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

binary

$$3.13 \rightarrow 0011.0010011$$

$$3.07421875_{10} = 11.00010011_2$$

octal

$$\boxed{011}.\boxed{000}\boxed{100}\boxed{110}_2$$

3. 0 4 6₈

$$3.07421875_{10} = 3.046_8$$

Nasa format

$$\underbrace{11.00010011}_2 \quad 2 = 00000010$$

Nasa

$$0.1 \mid 0001001 \mid 00000000000000000010$$

b) Nasa format negative

$$\begin{array}{r} 011000100110000000000000 \\ 1001110110011111111111 \\ + \\ \hline 100111011010000000000000 \end{array}$$

$$-3.07421875_{10} \text{ in Nasa format } 100111011010000000000000000010$$

0.2

a) hex $0.2 \cdot 16 = 3.2$
 $0.2 \cdot 16 = 3.2$
 $0.2_{10} = 0.3\overline{3}_6$

binary $0.3\ 3\ \overline{3}$
 0.001100110011

Octal $0.\boxed{001}\boxed{100}\boxed{100}\boxed{11}$
 $0.1\ 4\ 6\ 3$
 $0.2_{10} = 0.146\overline{3}$

Nasa Format $0.\underbrace{001100110011}_{-2}$ $2 = 00000010$
 11111101
 $+$
 11111110

0.2_{10} in nasa format $0.11001100110011001100110011001100$

b) Negative 011001100110011001100110
 100110011001100110011001
 $+$
 100110011001100110011010

-0.2_{10} in nasa format $1001100110011001100110101111110$

Answer to part c on
 next page

c) 6999902 Nasa to Decimal

6 9 9 9 9 9 0 2
 0110 1001 1001 1001 1001 1001 0000 0010
 w 2

Binary: 11.010011001100110011001
 $2^1 + 2^0 \quad 2^{-2} + 2^{-3} + 2^{-4} + 2^{-9} + 2^{-10} + 2^{-13} + 2^{-14} + 2^{-17} + 2^{-18} + 2^{-21}$
 3 + 0.299999714
 3.299999714

6999903 Nasa to decimal

6 9 9 9 9 9 0 3
 0110 1001 1001 1001 1001 1001 0000 0011
 w 3

Binary: 110.10011001100110011001
 $2^2 + 2^1 \quad 2^{-1} + 2^{-4} + 2^{-5} + 2^{-8} + 2^{-9} + 2^{-12} + 2^{-13} + 2^{-16} + 2^{-17} + 2^{-20}$
 6 + 0.599999428
 6.599999428

966667FF Nasa to decimal

9 6 6 6 6 7 F F
 negative 0001 0110 0110 0110 0110 0111 1111 1111
 1001 0110 0110 0110 0110 0110
 0110 1001 1001 1001 1001 1001
 11111111
 11111110
 00000001
 -1₁₀

binary — 0.011010011001100110011001

$$2^{-2} + 2^{-3} + 2^{-5} + 2^{-6} + 2^{-9} + 2^{-12} + 2^{-13} + 2^{-16} + 2^{-17} + 2^{-20} + 2^{-21} + 2^{-24}$$

— 0.41244464