

* Other number systems:-

Convert into decimal.

$$\begin{matrix} 2^1 & 1^0 & -1 & -2 \\ \times 1 & \times 1 & \times 1 & \times 1 \\ \hline \end{matrix}$$

$$(135.42)_{10} = ()_{10}$$

$$x = 6 \quad 4 \times 6^{-1} + 2 \times 6^{-2} = \frac{4}{6} + \frac{2}{36} = \underline{\quad}$$

Decimal Binary Octal Hex

$$(59.722222)_{10}$$

$$(1) (539.6A)_{12} = ()_{10}$$

$$(2) (3425.61)_7 = (1244.6666)_{10}$$

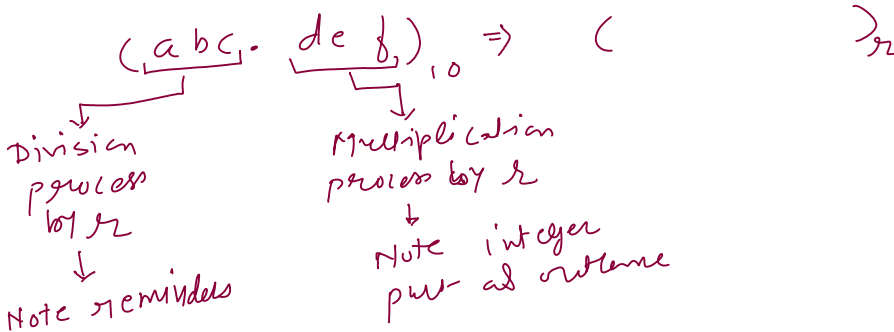
$$(3) (232.313)_4 = (46.859375)_{10}$$

$$\begin{aligned} & (5 \times 12^2) + 3 \times 12^1 + 9 \times 12^0 + 6 \times 12^{-1} + A \times 12^{-2} \\ & = 720 + 36 + 9 + 0.5 + \left(\frac{10}{144}\right) = 0.0694444 \end{aligned}$$

$$= (765.5694444)_{10}$$

Any number system \rightarrow Decimal

* Convert a decimal number into any other number system:-



$$(1) (48)_{10} = ()_2$$

2	48	
2	24	0
2	12	0
2	6	0
2	3	0
2	1	1
	0	1

$$(110000)_2 = (48)_{10}$$

$$1 \times 2^5 + 1 \times 2^4 = 32 + 16 = (48)_{10}$$

2	1	1
0		1

$$32 + 10 = 42$$

(2)

2	129	
2	64	1
2	32	0
2	16	0
2	8	0
2	4	0
-2	2	0
2	1	0
		1

$$(129.35)_{10} \Rightarrow ($$

Division Multiplication

(2)

$$1 \times 2^7 + 1 \times 2^0 =$$

$$(10000001)_2$$

$$1 \times 2^7 + 1 \times 2^0 =$$

$$128 + 1 = (129)_{10}$$

$$(0.35)_{10} = (0.010110)_2$$

$$(48.35)_{10} \downarrow$$

$$(110000.010110)_2$$

$$\begin{aligned} 0.35 \times 2 &= 0.70 & 0 \\ 0.70 \times 2 &= 1.40 & 1 \\ 0.40 \times 2 &= 0.80 & 0 \\ 0.80 \times 2 &= 1.60 & 1 \\ 0.60 \times 2 &= 1.20 & 1 \\ 0.20 \times 2 &= 0.40 & 0 \end{aligned}$$

$$(1) (135.67)_{10} = (10000111.101010)_2$$

$$(2) (251.15)_{10} = (11111011.001001...)_{2}$$

$$(3) (256.99)_{10} = (100000000.111111...)_{3}$$

$$\begin{aligned} 256 &= 1 \times 2^{-1} + 1 \times 2^{-2} + 1 \times 2^{-3} + 1 \times 2^{-4} \\ &\quad + 1 \times 2^{-5} + 1 \times 2^{-6} \\ &= \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{64} \end{aligned}$$

$$= 0.5 + 0.25 + 0.125 + 0.0625 + 0.03125 + 0.015625$$

$$= (0.984375)_{10} \neq (0.99)_{10}$$

(111111) \uparrow Compromised the accuracy.

\Rightarrow Decimal to octal & Hexadecimal Number system:-

$$(1) (252.99)_{10} = (400.772702)_8 = (\underline{100.FD70A3})_{16}$$

$$(2) (1035.250)_{10} = (2013.2000)_8 = (\underline{40B.4})_{16}$$

$$(3) (3092.8125)_{10} = (6024.6400)_8 = (\underline{C14.D})_{16}$$

$$(4) (256.99)_{10} = (213.A9876)_8 = (\underline{514.663366})_7$$

$$(5) (1035.258)_{10} = (1370.226554)_9 = (\underline{1102100.020220})_3$$

$$\begin{array}{rcl} 0.256 \times 3 & = & 0.768 \quad 0 \\ 0.768 \times 3 & = & 2.304 \quad 2 \\ 0.304 \times 3 & = & 0.912 \quad 0 \\ 0.912 \times 3 & = & 2.736 \quad 2 \\ 0.736 \times 3 & = & 2.208 \quad 2 \\ 0.208 \times 3 & = & 0.624 \quad 0 \end{array}$$

