

1

$$10^{14} \rightarrow \begin{array}{c|c} 10^{14} & | \\ \hline 1 & 10^{13} \\ & | \\ & 10^{12} \\ & | \\ & 10^{11} \\ & | \\ & 10^{10} \\ & | \\ & 10^9 \\ & | \\ & 10^8 \\ & | \\ & 10^7 \\ & | \\ & 10^6 \\ & | \\ & 10^5 \\ & | \\ & 10^4 \\ & | \\ & 10^3 \\ & | \\ & 10^2 \\ & | \\ & 10^1 \\ & | \\ & 10^0 \end{array} \quad (10^{14})_r = (1111111111)_r$$

\downarrow (1111111111)_r = ($x^0 1$) + ($x^1 1$) + ($x^2 1$) + ($x^3 1$) + ($x^4 1$) + ($x^5 1$) + ($x^6 1$) + ($x^7 1$) + ($x^8 1$) + ($x^9 1$) + ($x^{10} 1$) = 1 + 2 + 4 + 8 + 16 + 32 + 64 + 128 + 256 + 512 = (1023)

2

$$10^{14} \rightarrow \begin{array}{c|c} 10^{14} & | \\ \hline 1 & 10^{13} \\ & | \\ & 10^{12} \\ & | \\ & 10^{11} \\ & | \\ & 10^{10} \\ & | \\ & 10^9 \\ & | \\ & 10^8 \\ & | \\ & 10^7 \\ & | \\ & 10^6 \\ & | \\ & 10^5 \\ & | \\ & 10^4 \\ & | \\ & 10^3 \\ & | \\ & 10^2 \\ & | \\ & 10^1 \\ & | \\ & 10^0 \end{array} \quad (10^{14})_r = (1000000000001)_r$$

\downarrow (1000000000001)_r = ($x^0 1$) + ($x^1 0$) + ($x^2 0$) + ($x^3 0$) + ($x^4 0$) + ($x^5 0$) + ($x^6 0$) + ($x^7 0$) + ($x^8 0$) + ($x^9 0$) + ($x^{10} 1$) + ($x^{11} 0$) + ($x^{12} 0$) + ($x^{13} 0$) + ($x^{14} 1$) = 1 + 10^{14} = (10^{14})_r

3

$$10^{14} \rightarrow \begin{array}{c|c} 10^{14} & | \\ \hline 1 & 10^{13} \\ & | \\ & 10^{12} \\ & | \\ & 10^{11} \\ & | \\ & 10^{10} \\ & | \\ & 10^9 \\ & | \\ & 10^8 \\ & | \\ & 10^7 \\ & | \\ & 10^6 \\ & | \\ & 10^5 \\ & | \\ & 10^4 \\ & | \\ & 10^3 \\ & | \\ & 10^2 \\ & | \\ & 10^1 \\ & | \\ & 10^0 \end{array} \quad (10^{14})_r = (1000001100100)_r$$

\downarrow (1000001100100)_r = ($x^0 0$) + ($x^1 0$) + ($x^2 1$) + ($x^3 0$) + ($x^4 0$) + ($x^5 0$) + ($x^6 1$) + ($x^7 0$) + ($x^8 0$) + ($x^9 0$) + ($x^{10} 0$) + ($x^{11} 1$) + ($x^{12} 0$) + ($x^{13} 0$) + ($x^{14} 0$) + ($x^{15} 1$) = (1023)

Subject:

Year:

Month:

Date:

(F)

Q1111

$$\begin{array}{r} 11111 \\ - 11110 \\ \hline 1111 \\ - 1110 \\ \hline 111 \\ - 110 \\ \hline 11 \\ - 10 \\ \hline 1 \\ - 1 \\ \hline 0 \end{array}$$

$$(11111)_2 = (10100110111)_2$$

Q1111

$$\begin{array}{l} (101001101111)_2 = (x_0^0) + (x_1^1) + (x_2^2) + (x_3^3) + (x_4^4) + (x_5^5) + (x_6^6) + (x_7^7) + (x_8^8) + (x_9^9) \\ + (x_{10}^{10}) + (x_{11}^{11}) = 1^0 + 1^1 + 1^2 + 1^3 + 1^4 + 1^5 + 1^6 + 1^7 + 1^8 + 1^9 + 1^{10} + 1^{11} = (11111)_10 \end{array}$$

(a)

$$\begin{array}{r} 11111 \\ - 11110 \\ \hline 1111 \\ - 1110 \\ \hline 111 \\ - 110 \\ \hline 11 \\ - 10 \\ \hline 1 \\ - 1 \\ \hline 0 \end{array}$$

$$(10100110110)_2 = (x_0^0) + (x_1^1) + (x_2^2) + (x_3^3) + (x_4^4) + (x_5^5) + (x_6^6) + (x_7^7) + (x_8^8) + (x_9^9) + (x_{10}^{10})$$

$$= 1^0 + 1^1 + 1^2 + 1^3 + 1^4 + 1^5 + 1^6 + 1^7 + 1^8 + 1^9 + 1^{10} = 11111$$

(q)

$$\begin{array}{r} 11111 \\ - 11110 \\ \hline 1111 \\ - 1110 \\ \hline 111 \\ - 110 \\ \hline 11 \\ - 10 \\ \hline 1 \\ - 1 \\ \hline 0 \end{array}$$

$$(11110000010)_2 = (x_0^0) + (x_1^1) + (x_2^2) + (x_3^3) + (x_4^4) + (x_5^5) + (x_6^6) + (x_7^7) + (x_8^8) + (x_9^9) + (x_{10}^{10})$$

$$+ (x_{11}^{11}) = 1^0 + 1^1 + 1^2 + 1^3 + 1^4 + 1^5 + 1^6 + 1^7 + 1^8 + 1^9 + 1^{10} + 1^{11} = (11111)_10$$

1

$$F \wedge 14 \Rightarrow F \wedge 14 \quad | \quad \begin{array}{c} F \\ -F \wedge 14 \\ \hline 1 \end{array} \quad | \quad \begin{array}{c} F \\ PF \wedge F \\ PF \wedge 14 \\ \hline 1 \end{array} \quad | \quad \begin{array}{c} F \\ 14 \wedge F \\ -14 \wedge F \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ 40F \\ -40F \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \wedge 1 \\ F \wedge .. \\ \hline 1 \end{array} \quad | \quad \begin{array}{c} F \\ 140 \\ -140 \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ V_{10} \\ -V_{10} \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ V_{14} \\ -V_{14} \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ 1A \\ -1A \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ 1A \\ -1A \\ \hline 0 \end{array} \quad | \quad \begin{array}{c} F \\ 1A \\ -1A \\ \hline 0 \end{array}$$

$$\begin{aligned} L \rightarrow (1_{100} + 1_{10} + 1_{100} + 1_1)_{10} &= (1^0 x^0) + (1^1 x^1) + (1^0 x^0) + (1^1 x^0) + (1^0 x^1) + (1^0 x^0) + (1^1 x^1) + (1^0 x^0) + (1^1 x^1) \\ &+ (1^0 x^0) + (1^0 x^0) + (1^1 x^1) = 1 + 1^0 + 1^0 + 1^0 + 1^0 + 1^0 + 1^0 + 1^0 + 1^0 = (FA(10)) \end{aligned}$$

1

$$+ (\overset{4}{\times} \overset{1}{\circ}) + (\overset{1}{\times} \overset{1}{\circ}) + (\overset{1}{\times} \overset{1}{1}) = 1 + 1 + 1 + 1 + 1 + 1 = (1000)$$

4

$$\text{PFPA} \rightarrow \frac{\text{PFPA}}{\text{PFPA}} = \left(\log_{10} 1111100 \right)_P$$

$$\begin{aligned} \left(\begin{smallmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 & 0 \end{smallmatrix} \right)_4 &= (\text{F}^1_{X0}) + (\text{F}^1_{X0}) + (\text{F}^1_{X1}) \\ &+ (\text{F}^2_{X0}) + (\text{F}^2_{X0}) + (\text{F}^2_{X1}) = (\text{FFKA}) \end{aligned}$$

10

$$1234 \Rightarrow \begin{array}{r} 1234 \\ 1234 \\ \hline 0 \end{array} \quad \begin{array}{r} r \\ 410 \\ 414 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 2 \cdot 1 \\ 2 \cdot 1 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array} \quad \begin{array}{r} r \\ 100 \\ 100 \\ \hline 1 \end{array}$$
$$(1234)_r = (10.1101001.)_r$$

~~1234 = 1 \cdot 10^3 + 2 \cdot 10^2 + 3 \cdot 10^1 + 4 \cdot 10^0~~

$$(10.1101001.)_r = (r^{x_0}) + (r^{x_1}) + (r^{x_2}) + (r^{x_3}) + (r^{x_4}) + (r^{x_5}) + (r^{x_6}) + (r^{x_7}) + (r^{x_8})$$
$$+ (r^{x_9}) = r^9 + 1r^8 + 4r^7 + 1r^6 + 1r^5 + 1r^4 + 1r^3 + 1r^2 + 1r^1 + 1r^0$$
$$(1234)_r ..$$