

PART A:

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$$255.375_{10}$$

$$\begin{array}{r} 2 \overline{) 255} \\ 127 \end{array}$$

$$\begin{array}{r} 2 \overline{) 127} \\ 63 \end{array}$$

$$\begin{array}{r} 2 \overline{) 63} \\ 31 \end{array}$$

$$\begin{array}{r} 2 \overline{) 31} \\ 15 \end{array}$$

$$\begin{array}{r} 2 \overline{) 15} \\ 7 \end{array}$$

$$\begin{array}{r} 2 \overline{) 7} \\ 3 \end{array}$$

$$\begin{array}{r} 2 \overline{) 3} \\ 1 \end{array}$$

$$\begin{array}{r} 2 \overline{) 1} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 2 \overline{) 0} \\ 0 \end{array}$$

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$$\begin{array}{r} 2 \overline{) 0} \\ 0 \end{array}$$

$$0.375_{10}$$

$$0.375 \times 2$$

$$= 0.750$$

$$0.750 \times 2$$

$$= 1.500$$

$$0.500 \times 2$$

$$= 1.000$$

$$1.000 \times 2$$

$$= 2.000$$

$$2.000 \times 2$$

$$= 4.000$$

$$4.000 \times 2$$

$$= 8.000$$

$$8.000 \times 2$$

$$= 16.000$$

$$16.000 \times 2$$

$$= 32.000$$

$$32.000 \times 2$$

$$= 64.000$$

$$64.000 \times 2$$

$$= 128.000$$

$$128.000 \times 2$$

$$= 256.000$$

$$256.000 \times 2$$

$$= 512.000$$

$$512.000 \times 2$$

$$= 1024.000$$

$$1024.000 \times 2$$

$$= 2048.000$$

$$2048.000 \times 2$$

$$= 4096.000$$

$$4096.000 \times 2$$

$$= 8192.000$$

$$255.375_{10} = 1111111.110_2$$

$$16 \overline{) 255.375}$$

$$\begin{array}{r} 16 \overline{) 255.375} \\ 15 \end{array}$$

$$\begin{array}{r} 16 \overline{) 15} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

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$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

$$\begin{array}{r} 16 \overline{) 0} \\ 0 \end{array}$$

$$0.375 \times 16$$

$$= 6$$

$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

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$$0.75 \times 16$$

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$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

$$= 12$$

$$0.75 \times 16$$

Fractional part

$$.101$$

$$(.5, .2)$$

$$(1 \times 2^{-1}) + (0 \times 2^{-2}) + (1 \times 2^{-3})$$

$$\frac{1}{2} + \frac{1}{8}$$

$$0.5 + 0.125$$

$$= 0.625$$

$$110101$$

$$1 \times 2^0 + 0 \times 2^1 + 1 \times 2^2 + 0 \times 2^3 + 1 \times 2^4 + 1 \times 2^5$$

$$1 + 4 + 16 + 32 = 53$$

$$(53.625)_{10}$$

3. If we get remainder when $2/3 = -1$ and if we get the sum of remainders as zero then it is divisible by 3

$$100111$$

$$1 \times 2^0 + 1 \times 2^1 + 1 \times 2^2 + 0 \times 2^3 + 0 \times 2^4 + 1 \times 2^5$$

$$1 - 1 + 1 + 0 + 0 - 1$$

$$= 0$$

\therefore It is divisible by 3

4.

$$\begin{array}{r|l} 2 & 25 \\ \hline 2 & 12 \\ \hline 2 & 6 \\ \hline 2 & 3 \\ \hline & 1 \end{array}$$

$$25_{10} = (11001)_2$$

~~complement~~

$$\overline{(00110)}$$

$$\overline{00111}$$

$$00011001$$

$$(11100110)_2$$

$$-25 = 11100111$$

5. $F = (A+B)(A'+C)(B+C')$

$$= AA' + AC + BA' + BC (B+C')$$

\downarrow
0

$$= AC + BA' + BC (B+C')$$

$$= \cancel{AB} ACB + BA'B + BCB + \underbrace{ACC'}_0 + BA'C + \underbrace{BCC'}_0$$

$$= ACB + BA' + BC + BA'C$$

$$= BA' + BC \text{ (Absorption law)}$$