Scenario:

You are a trainee at an engineering company. Your manager asked you to complete some mathematical operations related to specific engineering scenarios or expected to be part of the necessary skills you must have while solving arithmetic operations in engineering problems.

Activity 1:

Evaluate the following arithmetic expression as a single number with 3 decimal places. You must show all details.

$$\frac{((537.17)_8 \times (2\Lambda5.193)_{12}) - (2DA.5E8)_{16}}{(1001010011.1001)_2 + (279.56)_{10}} = (\quad)_{16}$$

I will convert every thing to dec

$(537.17)_8 = (351.121875)_{10}$

$= 7*8^0 + 3*8^1 + 5*8^2 + 1*8^{-1} + 7*8^{-2}$

$= 7 + 24 + 320 + 0.125 + 0.109375$

$= \boxed{351.121875}$

$(2\Lambda5.193)_{12} = (426.881943)_{10}$

$= 5*12^0 + 11*12^1 + 2*12^2 + 1*12^{-1} + 9*12^{-2} + 3*12^{-3}$

$= 5 + 132 + 288 + 1/12 + 0.0625 + 1.73611$

$= \boxed{426.881943}$

$(2DA.5E8)_{16} = (730.3691406)_{10}$

$= 10*16^0 + 13*16^1 + 2*16^2 + 5*16^{-1} + 14*16^{-2} + 8*16^{-3}$

$= 10 + 208 + 512 + 5/16 + 7/128 + 1/512$

$= \boxed{730.3691406}$

$(1001010011.1001)_2 = (595.5625)_{10}$

$1*2^0 + 1*2^1 + 0*2^2 + 0*2^3 + 1*2^4 + 0*2^5 + 1*2^6 + 0*2^7 + 0*2^8 + 1*2^9 + 1*2^{-1} + 0*2^{-2} + 0*2^{-3} + 1*2^{-4}$

$= 1 + 2 + 16 + 64 + 512 + 0.5 + 0.0625$

$= \boxed{595.5625}$

Now write every thing in dec

$$= \frac{(351.121875 * 426.881943) - 730.3691406}{595.5625 + 279.56}$$

$$= \frac{149887.5882 - 730.3691406}{875.1225}$$

$$= \frac{149887.5882 \quad \ldots}{875.1225}$$

$$= \frac{149157.2191}{875.1225} = \boxed{170.441531}$$ * in dec

Now converting this to Hex

* we take the Ineger first

$(170)_{10} \Rightarrow (AA)_{16}$

$16 \overline{)\,10\,}$ → 0, remainder $\boxed{10}$ = A

$16 \overline{)\,170\,}$ → 10, $170 - 160$, remainder $\boxed{10}$ = A

* Now the nums after the decemal point

$(0.441531)_{10} \Rightarrow (0.71082)_{16}$

$0.441531 * 16 = \textcircled{7}.064496$

$0.064496 * 16 = \textcircled{1}.031936$

$0.031936 * 16 = \textcircled{0}.510976$

$0.510976 * 16 = \textcircled{8}.175616$

$0.175616 * 16 = \textcircled{2}.809856$

0.175616 * 16 = 2.809856

* Now we sum the Int with decemal

4A + 0.71082

= 4A.71082

* Now making it in 3 sig

4A.71082

= AA.711 ※

* we do it when the num = or bigger than 16/2 = 8 and the num is 8 in the qustion

Activity 2:

Find the value of Y (in Octal) that makes the following equality true.

$$[Y]^{(2A)_{12}} = (553.92)_{10}$$

the First thing is to mak

$(2A)_{12} \Rightarrow (35)_{10}$

$A * 12^0 + 2 * 12^1$

$= 11 + 24 = 35$

$$y^{35} = 553.92$$

$$y = \sqrt[35]{553.92}$$

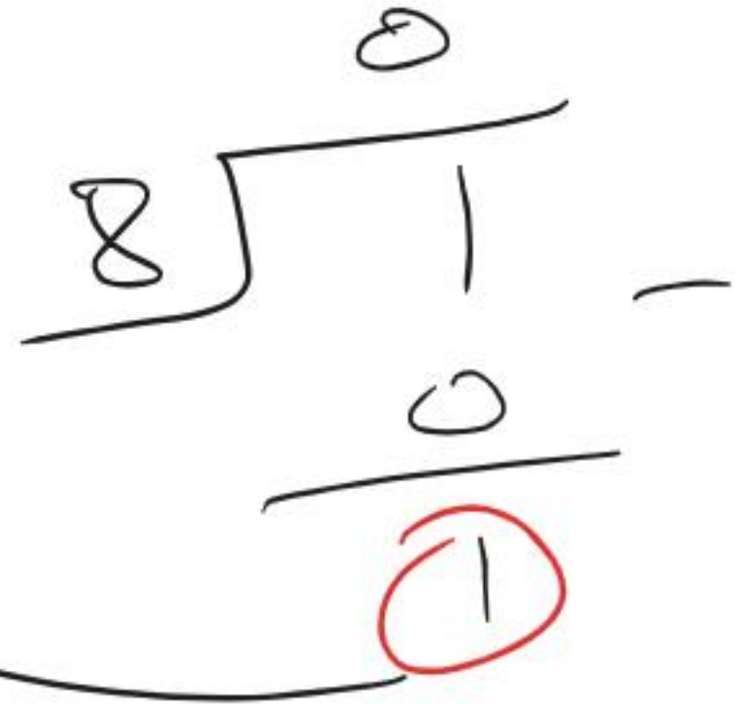
$$y = (553.92)^{(1/35)}$$

$$y = 1.19779$$ * in dec

* Now convert to oct

* the Int

$(1)_{10} \Rightarrow (\quad)_8$



* the decimal point

$(0.19779)_{10} \Rightarrow (0.14521)_8$

$0.19779 * 8 = 1.58232$

$0.58232 * 8 = 4.65856$

$0.65856 * 8 = 5.26848$

$0.26848 * 8 = 2.14784$

$0.14784 * 8 = 1.18272$

* Now we sum the Int with deccmal

$y = 1 + 0.14521$

$y = 1.14521$ ✗✗

4 in oct