Main_13

$X_{10} = 16x_{10}$ may be 163 or 167

$Y_{10} = 8y_{10}$ *may be 83 or 89*

X_{10}

128	64	32	16	8	4	2	1
1	0	1	0	0	0	1	1

163 in binary → 10100011_2

128	64	32	16	8	4	2	1
1	0	1	0	0	1	1	1

167 in binary → 10100111

Y_{10}

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

83 in binary → 1010011

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

89 in binary → 1011001

$P_2 = X_2 : AND : Y_2$

$P_2 = 163_{10} : AND : 83_{10}$

X	1	0	1	0	0	0	1	1
Y	0	1	0	1	0	0	1	1
P = X AND Y	0	0	0	0	0	0	1	1

We have 2 possible X values and 2 possible Y values. This one did not work. Now to try the others.

$P_2 = X_{10} : AND : Y_{10}$

$P_2 = 163_{10} : AND : 89_{10}$

X	1	0	1	0	0	0	1	1
Y	0	1	0	1	1	0	0	1
P = X AND Y	0	0	0	0	0	0	0	1

The second try we got lucky and got the correct value for P_2. I know this because this value has a single 1 bit.

$X_{10} = 163_{10}$ AND $Y_{10} = 89_{10}$

If we do an OR table with these values we can also verify that our answer is correct.

$Q_2 = X_{10} : OR : Y_{10}$

$Q_2 = 163_{10} : OR : 89_{10}$

X	1	0	1	0	0	0	1	1
Y	0	1	0	1	1	0	0	1
P = X OR Y	1	1	1	1	1	0	1	1

To try other possiblilites;

The other possiblities are $P_2 = 167\ and\ 83, 167\ and\ 89,\ \ Q_2 = 167\ or\ 83, 167\ or\ 89.$

Using and first

$P_2 = X_{10} : AND : Y_{10}$

$P_2 = 167_{10} : AND : 83_{10}$

X	1	0	1	0	0	1	1	1
Y	0	1	0	1	0	0	1	1
P = X AND Y	0	0	0	0	1	0	1	1

three, 1 bits. 5, 0 bits. neither P nor Q.

Since this AND does not work with these two numbers. It does not matter if the OR works or not. It cannot be the correct 2 numbers.

$P_2 = X_{10} : AND : Y_{10}$

$P_2 = 167_{10} : AND : 89_{10}$

X	1	0	1	0	0	1	1	1
Y	0	1	0	1	1	0	0	1
P = X AND Y	0	0	0	0	0	0	0	1

single 1 bit. 7, 0 bits. can be P_2 now to check the OR table to see if it matches Q_2

$Q_2 = X_{10} : OR : Y_{10}$

$Q_2 = 167_{10} : OR : 89_{10}$

X	1	0	1	0	0	1	1	1
Y	0	1	0	1	1	0	0	1
P = X OR Y	1	1	1	1	1	1	1	1

As the logic proves, $167_2 \ \ OR \ \ 89_2$ is **CANNOT BE** Q_2

Answers (justified by AND/ OR tables);

$X_{10} = 163_{10}$

$Y_{10} = 89_{10}$