

19.10.26

Forwards add Backwards

(Nrich Live Problem)

Q1:

Ans: Here are two other ways to make a total of 747:

$$\begin{array}{r} \boxed{7} \boxed{2} \boxed{0} \\ + \boxed{0} \boxed{2} \boxed{7} \\ \hline 747 \end{array}$$

$$\begin{array}{r} \boxed{5} \boxed{2} \boxed{2} \\ + \boxed{2} \boxed{2} \boxed{5} \\ \hline 747 \end{array}$$

Q2:

Ans: Here are all the totals between 100-800 that can be made from a number plus its reversal:

707 family

$$707 = 205 + 502$$

$$727 = 215 + 512$$

$$747 = 225 + 522$$

$$767 = 235 + 532$$

$$787 = 245 + 542$$

706 family

$$706 = 155 + 551$$

$$726 = 165 + 561$$

$$746 = 175 + 571$$

$$766 = 185 + 581$$

$$786 = 195 + 591$$

Q3.

Ans:

707 family

Step 1) ~~2~~

The outer number stay as 2 and 5.

Step 2)

The inner middle number changes in the number changes in the order from 0-4, so that no carryover is generated.

Step 3)

The last possible total in this family is
 $245 + 542 = 787$

706 family

Step 1)

The outer numbers are 1, 5.

Step 2)

The inner middle needs to generate a carryover so the number order is from 5-9

Step 3

All possible totals are found.

Q4.

Ans:

Here are all the total between 300-400:

$$303 = 201 + 102$$

$$323 = 211 + 112$$

$$343 = 221 + 122$$

$$363 = 231 + 132$$

$$383 = 241 + 142$$

302 family

$$302 = 151 + 151$$

$$322 = 161 + 161$$

$$342 = 171 + 171$$

$$362 = 181 + 181$$

$$382 = 191 + 191$$

Here are all the totals between 800-900:

$$808 = 305 + 503$$

$$828 = 315 + 513$$

$$848 = 325 + 523$$

$$868 = 335 + 533$$

$$888 = 345 + 543$$

807 family

$$807 = 354 + 453$$

$$827 = 364 + 463$$

$$847 = 374 + 473$$

$$867 = 384 + 483$$

$$887 = 394 + 493$$

Q5

Ans: The 3 digit number and its reversal that adds up to 1251 is:

$$\begin{array}{r} 279 \\ + 972 \\ \hline 1251 \end{array}$$

$$\text{Ans: } 279 + 972$$

Q8

Ans: Here are the totals between 1200-1300 that can be made from a number plus its reversal:

$$1251 = 279 + 972$$

$$1271 = 289 + 982$$

$$1231 = 962 + 269$$

$$1211 = 952 + 259$$

$$1291 = 992 + 299$$

$$1290 = 892 + 298$$

Q71

Ans:

The totals between 1900-2000 are:

$$1918 = 959 + 959$$

$$1930 = 969 + 969$$

$$1958 = 979 + 979$$

$$1978 = 989 + 989$$

Q8

Ans:

The only total between 200-300 is:

$$\begin{array}{r} 8 \quad 2 \quad 16 \\ 936 \\ - 639 \\ \hline 297 \end{array}$$

$$\text{Ans: } 936 - 639 = 297$$

Q9.

Ans: The numbers between 1200 - 1300 are:

a) 1269

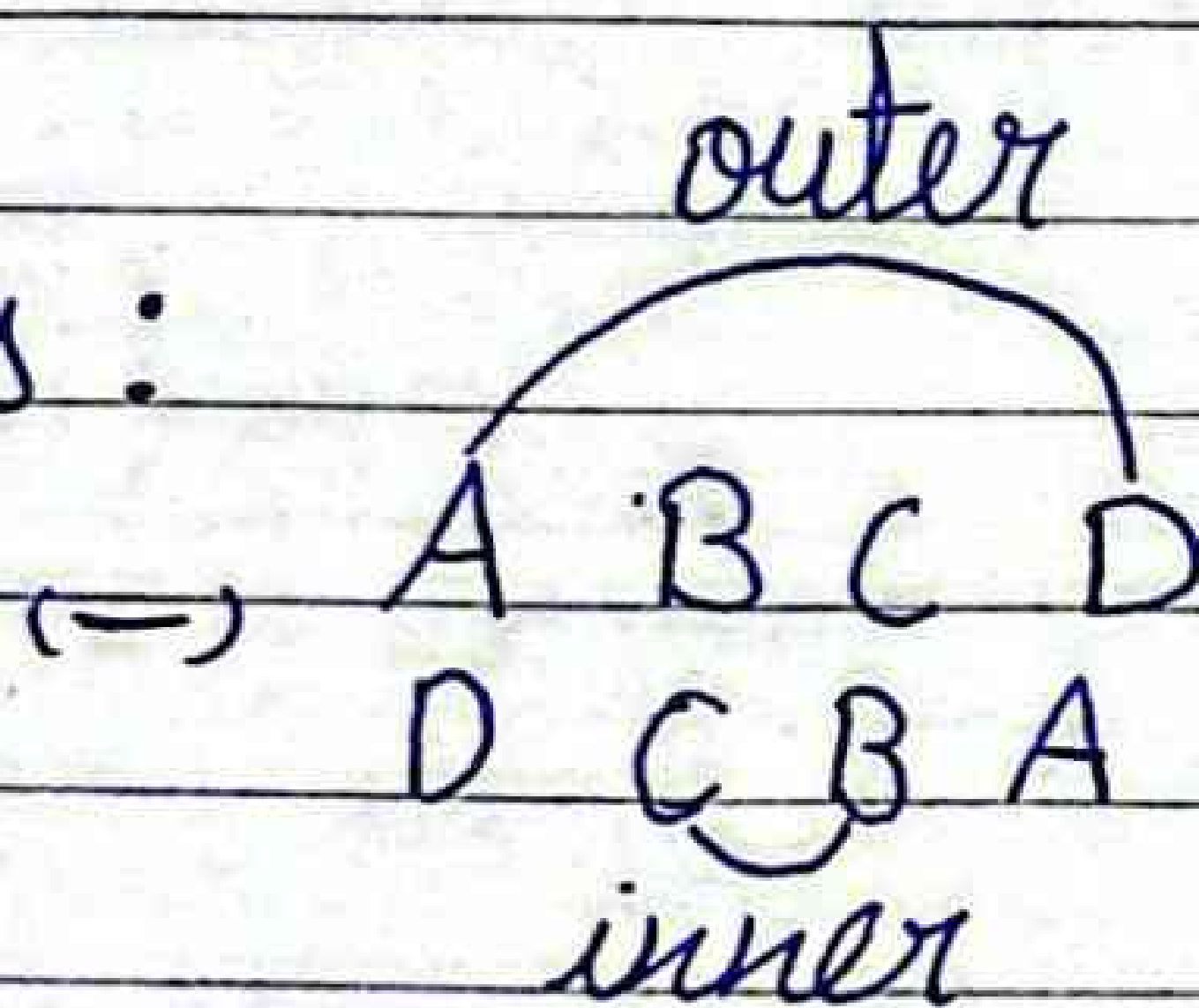
$$\begin{array}{r} 71411 \\ - 2851 \\ \hline 1582 \\ \hline 1269 \end{array}$$

b) 1278

$$\begin{array}{r} 411813 \\ - 5193 \\ \hline 3915 \\ \hline 1278 \end{array}$$

Q10.

Ans: Yes, as:



Try ①: When $A > D$ by 1 and $B > C$ by 3.

Exc: $2961 \rightarrow 1692 = 1269$.

Any 4 digit number and its reversal subtracted in the above rule will give 1269

Try ②: When $A > D$ by 2 and $B < C$ by 8.

Exc: $5193 \rightarrow 3915 = 1278$

Any 4 digit number and its reversal subtracted in the above rule will give 1278

Try ③: when $A > 0$ by 3 & the number is not between 1200 ~~at~~ - 1300 this we know 1269 and 1278 are the only possibilities.