Hrishikesh . Nayak
classmate
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Granit Kreeda -
More less is more

1. Imagine that the numbers 1, 2, 3, 4, 5, 6, 7, and 8 have been thrown. Where would you place them to get the highest possible score?

① Sum - Sum

$$\boxed{8}\boxed{3} + \boxed{5}\boxed{1} < \boxed{6}\boxed{4} + \boxed{7}\boxed{2}$$

$$134 < 136$$

② Take - Take

$$\boxed{7}\boxed{5} - \boxed{1}\boxed{4} < \boxed{8}\boxed{6} - \boxed{2}\boxed{3}$$

$$61 < 63$$

③ Take - sum

$$\boxed{8}\boxed{7} - \boxed{1}\boxed{2} < \boxed{5}\boxed{4} + \boxed{6}\boxed{3}$$

$$75 < 117$$

④ Sum - Take

$$\boxed{2}\boxed{5} + \boxed{4}\boxed{7} < \boxed{8}\boxed{6} - \boxed{1}\boxed{3}$$

$$72 < 73$$

2. Can you give an algorithm for all 4 versions?

ns ① Sum - sum

1. Take the 4 highest numbers, and place them in the 4 tens places. Try to equalize the tens place. If not possible, try to minimize the difference, but make the RHS greater than the LHS
2. arrange the ones place so that you get the highest possible score by minimizing the difference between the LHS and RHS after addition.

② take - take

1. Place the 2 highest numbers in the tens place of both minuends. ~~The~~ ~~sm~~ If the numbers are unequal, place ~~the~~ the higher number on the RHS. The RHS & LHS minuends get the 3rd & 4th highest nos ~~respectively~~
2. Place the 2 smallest numbers in the subtrahends' tens place. Try to equalize the LHS & RHS after subtraction of the tens place. If this is not possible, minimize the difference Between the LHS & RHS tens places after subtraction, but make sure the RHS is greater than the LHS.
3. Place the remaining 2 numbers so that you get

the Highest possible score by minimizing the difference between LHS & RHS after subtraction.

③ Take - sum

1. Place the highest number in the LHS minuend ones place, and the second highest in the LHS minuend ones place.
2. Place the lowest number on the LHS subtrahend tens place.
3. Place the second lowest number on the RHS subtrahend ones place.
4. Of the remaining 4 numbers, place the 2 highest ones on the tens places of RHS.
5. Place the remaining 2 numbers on the RHS ones places.
6. If the inequality does not stand true, exchange one of the RHS tens places with the LHS minuend ones place. ~~continue this process until the inequality stands true.~~

④ Sum - Take

1. Place the 2 highest numbers on the RHS minuend. The higher number goes on the tens place, and the lower one goes on the ones place.
2. Place the 2 lowest numbers on the RHS subtrahend. The lower one will go on the ~~ones place, and the higher one~~ tens place, and the higher one will go on the ones place.
3. With the remaing 4 numbers, make the LHS as high as possible while making sure that the inequality stands true.
4. If the Inequality doesn't stand true, exchange the lowest LHS tens place with the RHS subtrahend ones place. If they both are equal, it is impossib

To satisfy the inequality.

5. If, even after you do that, the inequality does not stand true, take the higher LHS tens place and exchange with the current RHS subtrahend ones place.

6. If the inequality still does not ~~stand~~ ~~satisfy~~ stand true, it is impossible to satisfy the inequality.

Examples:

Seem - seem:

39030607

(1): 4 highest numbers: 9, 7, 6, 3.

[9][ ] + [3][ ] < [7][ ] + [6][ ]

[minimize the difference].

(2) 4 numbers left = 0, 0, 3, 0.

[9][3] + [3][0] < [7][0] + [6][0]

[Try to minimize difference & get highest possible score]

Take - Take
1716 1816

① 4 highest numbers : 8, 7, 6, 6

[7][6] - [ ][ ] < [8][6] - [ ][ ]

② 2 lowest numbers : 1, 1

[7][6] - [1][ ] < [8][6] - [1][ ]

③ [7][6] - [1][1] < [8][6] - [1][1]

↓

2 remaining numbers : 1, 1

~~Sum - Take~~ Take - sum
4545 2655

1. 2 Highest numbers : 5 & 5

[5][5] - [ ][ ] < [ ][ ] + [ ][ ]

2. Lowest number : 0

[5][5] - [0][ ] < [ ][ ] + [ ][ ]

3. second lowest number : 2

[5][5] - [0][2] < [ ][ ] + [ ][ ]

4. Highest no possible out of : 5, 4, 5, 4.

[5][5] - [0][2] < [5][5] + [4][4]

Sum-take
22178471

1. 2 highest numbers: 8, 7.

□□ + □□ < 87 - □□

2. 2 lowest numbers: 1, 1

□□ + □□ < 87 - 11

3. Remaining 4 numbers: 2, 2, 4, 7

22 + 47 < 87 - 11

Tip: after following an algorithm, check if you can exchange the places of a few numbers while making the inequality stand true before submitting your ans.