

Examples N in Arithmetic 2

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Examples N

0. What is the thousand's digit in a number made of 97 of tens, 98 of hundreds, 95 of ones, and 39 of thousands?

1. Answering the questions below, use the numbers as follows.

9, 5, 2, 0, 4, 7, and 6

1.0. What is the 24th largest integer if we use each number once only?

1.1. What is the smallest 7-digit integer if we use each number once only?

1.2. What is the 18th smallest 7-digit integer if we use each number once only?

1.3. What is the smallest integer if we use all the numbers but once only?

1.4. What is the 4th largest number if we can use each number up to twice?

2. Find all possible integers that can be put in the blank below.

6900_080 > 69005081

3. What is the number that is the sum of 25 of 10's, 37 of 1's, 97 of 0.1's, 85 of 0.01's, 69 of 0.001's, and 78 of 0.0001's?

4. Make the second biggest integer and the second smallest integer using twice each all the numbers as follows. 0, 3, and 2.

6. Using the 8 numbers below once each, make the integer closest to 75000000.

4, 7, 0, 1, 5, 3, 8, and 2

7. Four people are making numbers using two sets of cards each. Each set is made of 10 different cards, each of which has one of 0, 1, 2, . . . 8 and 9. And each person has put 5 of the cards the way as follows.

Jane: 7, , 4, 2, 0, 3,

Mike: 7, 8, 9, , 4, 6,

Robert: 7, , , 6, 5, 1, 8

Becky: 7, 9, , 8, , 4, 3

Who then can make the largest number filling in the blanks?

Suggestions or Solutions To the Problems in the Examples N

0. What is the thousand's digit in a number made of 97 of tens, 98 of hundreds, 95 of ones, and 39 of thousands?

Getting the sum of the numbers, we get this:

$$\begin{aligned} 39 \times 1000 + 98 \times 100 + 97 \times 10 + 95 \times 1 &= 39000 + 9800 + 970 + 95 \\ &= 40000 - 1000 + 10000 - 200 + 1000 - 30 + 100 - 5 \\ &= 50000 - 135 = 49800 + 65 = 49865. \end{aligned}$$

So the 1000's digit is 9.

**1. Answering the questions below, use the numbers as follows.
9, 5, 2, 0, 4, 7, and 6**

1.0. What is the 80th largest integer if we use each number once only?

The largest integer will be a 7-digit integer.

And putting such integers in descending order, we can put them the way below.

9765420, 9765402,
9765240, 9765204, 9765042, 9765024,
9764520, 9764502, 9764250, 9764205, 9764052, 9764025,
9762540, 9762504, 9762450, 9762405, 9762054, 9762045,
9760542, 9760524, 9760452, 9760425, 9760254, 9760245,
9756420, 9756402, 9756240, 9756204, 9756042, 9756024, 9754620, 9754602,
9754260, 9754206, 9754062, 9754026, 9752640, 9752604, 9752460, 9752406,
9752064, 9752046, 9750642, 9750624, 9750462, 9750426, 9750264, 9750246,
9746520, 9746502, 9746250, 9746205, 9746052, 9746025, 9745620, 9745602,
9745260, 9745206, 9745062, 9745026, 9742650, 9742605, 9742560, 9742506,
9742065, 9742056, 9740652, 9740625, 9740562, 9740526, 9740265, 9740256,
9726540, 9726504, 9726450, 9726405, 9726054, 9726045, 9725640, 9725604.

1.1. What is the smallest 7-digit integer if we use each number once only?

We are given 7 single digit numbers, and of those, the smallest nonzero is 2.

So the smallest 7-digit integer begins with 2, that is, the highest digit is 2.

And the smaller the digit is, the smaller the number if the number is positive, of course.

Thus, the smallest 7-digit integer is 2045679.

1.2. What is the 18th smallest 7-digit integer if we use each number once only?

The largest integer will be a 7-digit integer.

And putting such integers in ascending order, we can put them the way below.

2045679, 2045697, 2045769, 2045796, 2045967, 2045976,
2046579, 2046597, 2046759, 2046795, 2046957, 2046975,
2047569, 2047596, 2047659, 2047695, 2047956, **2047965**.

1.3. What is the smallest integer if we use all the numbers but once only?

The same numbers can look different. So for instance, we can have $0001502 = 1502$, and $\frac{4}{2} = 2$. Thus, the smallest integer is 0245679, which is 245679, of course.

1.4. What is the 4th largest number if we can use each number up to twice?

The largest number is 99776655442200.

The second largest number is 99776655442020.

The third largest number is 99776655442002.

And the fourth largest number is 99776655440220.

2. Find all possible integers that can be put in the blank below:

6900_080 > 69005081

The number in the 1000's digit has to be greater than 5.

Therefore, we can put in the blank any of 6, 7, 8, and 9

3. What is the number that is the sum of 25 of 10's, 37 of 1's, 97 of 0.1's, 85 of 0.01's, 69 of 0.001's, and 78 of 0.0001's?

$$\begin{aligned} & 10 \times 25 + 1 \times 37 + 0.1 \times 97 + 0.01 \times 85 + 0.001 \times 69 + 0.0001 \times 78 \\ &= 250 + 37 + 9.7 + 0.85 + 0.069 + 0.0078 \\ &= 280 + 7 + 9 + 0.7 + 0.8 + 0.05 + 0.06 + 0.009 + 0.007 + 0.0008 \\ &= 280 + 16 + 1.5 + 0.11 + 0.016 + 0.0008 \\ &= 297 + 0.5 + 0.1 + 0.01 + 0.01 + 0.006 + 0.0008 \\ &= 297 + 0.6 + 0.02 + 0.006 + 0.0008 \\ &= 297.6268. \end{aligned}$$

4. Make the second biggest integer and the second smallest integer using twice each all the numbers as follows. 0, 3, and 2.

The biggest is 332200.

And the second biggest is 332020.

The smallest is 002233, which is 2233, of course.

And the second smallest is 002323, which is of course, 2323.

6. Using the 8 numbers below once each, make the integer closest to 75000000.

4, 7, 0, 1, 5, 3, 8, and 2

We have 7, 5 and 0 in 75000000. And we have 7, 5 and 0 in the list of the numbers.

So using 7 as the highest digit, using 5 as the second highest digit, and using 0 as the third highest, we get **75000000**. Then, we are left with these 5 numbers: 4, 1, 3, 8, and 2. What number then do we need to make?

It is the smallest 5-digit integer can be made of the 5 numbers left. And the smallest will be 12348. So the integer we want is $75000000 + 12348 = 75012348$.

7. Four people are making numbers using two sets of cards each. Each set is made of 10 different cards, each of which has one of 0, 1, 2, . . . 8 and 9. And each person has put 5 of the cards the way as follows.

Jane: 7, , 4, 2, 0, 3,

Mike: 7, 8, 9, , 4, 6,

Robert: 7, , , 6, 5, 1, 8

Becky: 7, 9, , 8, , 4, 3

Who then can make the largest number filling in the blanks?

Each person has used 5 cards. So they now have 15 cards each.

Jane has 2 of 1s, 5s, 6s, 8s, and 9s each, and 1 of 0s, 2s, 3s, 4s, and 7s each.

That is, she has now these: 1, 1, 5, 5, 6, 6, 8, 8, 9, 9, 0, 2, 3, 4, and 7.

So the biggest number she can make is 7942039.

Mike has 2 of 0s, 1s, 2s, 3s, and 5s each, and 1 of 4s, 6s, 7s, 8s, and 9s each.

So the biggest number he can make is 7899468.

Robert has 2 of 0s, 2s, 3s, 4s, and 9s each, and 1 of 1s, 5s, 6s, 7s, and 8s each.

So the biggest number he can make is 7996518.

Becky has 2 of 0s, 1s, 2s, 5s, and 6s each, and 1 of 3s, 4s, 7s, 8s, and 9s each.

So the biggest number she can make is 7998843.

Thus, Becky should be able to make the largest number.