

The number 3797 has an interesting property. Being prime itself, it is possible to continuously remove digits from left to right, and remain prime at each stage: 3797, 797, 97, and 7. Similarly we can work from right to left: 3797, 379, 37, and 3. Find the only four-digit prime number with this property.

Solution.

Easy to understand, that our number should not contain even digits (except the first digit), because if we remove digits from right to left, we will receive even numbers, that divided by 2. Similarly, numbers that contain '5' and numbers, that have '9' at the first and the last place.

Therefore, we have only these numbers:

1117, 1171, 1193, 1373, 1733, 1777, 1913, 1931, 1933, 1973, 1993, 1997, 2111, 2131, 2137, 2311, 2333, 2371, 2377, 2393, 2711, 2713, 2731, 2777, 2917, 2971, 3137, 3313, 3331, 3371, 3373, 3793, 3911, 3917, 5171, 5333, 5711, 5737, 7193, 7331, 7333, 7351, 7793, 7937, 7993.

Let us analyze these numbers. If we remove the last digit from the row of numbers, we receive certain primes. After that, we have these numbers:

1373, 1733, 1913, 1931, 1933, 1973, 1993, 1997, 2111, 2333, 2393, 2711, 2713, 2777, 3137, 3313, 3371, 3373, 5711, 7193, 7333.

Similarly, remove one more digit. We receive:

1373, 1733, 1913, 1931, 1933, 1973, 1993, 1997, 2333, 2393, 3137, 7193, 7333.

Let remove the first digit from these row of numbers. We receive:

1373, 1733, 1997, 3137, 7193.

Similarly, remove one more digit. We receive:

3137.

Answer: 3137.