

Investigate (n-1)-th and n-th powers of all integers mod n

```
n = 571; For [k = 0, k ≤ 20, Print[k, " ", PowerMod[k, n, n], " ", PowerMod[k, n - 1, n]]; k++]
```

```
0 0 0
```

```
1 1 1
```

```
2 2 1
```

```
3 3 1
```

```
4 4 1
```

```
5 5 1
```

```
6 6 1
```

```
7 7 1
```

```
8 8 1
```

```
9 9 1
```

```
10 10 1
```

```
11 11 1
```

```
12 12 1
```

```
13 13 1
```

```
14 14 1
```

```
15 15 1
```

```
16 16 1
```

```
17 17 1
```

```
18 18 1
```

```
19 19 1
```

```
20 20 1
```

```
FactorInteger[571]
```

```
Out[ ]=
```

```
{{571, 1}}
```

```
n = 581; For [k = 0, k ≤ 20, Print[k, " ", PowerMod[k, n, n], " ", PowerMod[k, n - 1, n]]; k++]
```

```
0 0 0
1 1 1
2 543 562
3 278 480
4 282 361
5 437 436
6 475 176
7 266 287
8 323 113
9 11 324
10 243 431
11 16 424
12 542 142
13 517 442
14 350 357
15 57 120
16 508 177
17 285 256
18 163 235
19 500 485
20 62 526
```

```
FactorInteger[581]
```

```
Out[*]=
```

```
{{7, 1}, {83, 1}}
```

```
n = 561; For [k = 0, k ≤ 20, Print [k, " ", PowerMod[k, n, n], " ", PowerMod[k, n - 1, n]]; k++]
```

0 0 0
1 1 1
2 2 1
3 3 375
4 4 1
5 5 1
6 6 375
7 7 1
8 8 1
9 9 375
10 10 1
11 11 154
12 12 375
13 13 1
14 14 1
15 15 375
16 16 1
17 17 34
18 18 375
19 19 1
20 20 1

FactorInteger[561]

Out[*]=
{ {3, 1}, {11, 1}, {17, 1} }

p = NextPrime[

7 865 433 872 657 824 562 485 762 487 564 759 876 395 762 398 573 498 237 493 749 263 523 957 624 956]

Out[*]=
7 865 433 872 657 824 562 485 762 487 564 759 876 395 762 398 573 498 237 493 749 263 523 957 625 039

a = 4 579 832 758 365 893 265 924 385 789 425 728 935 728 395 728 945 782 958

Out[*]=
4 579 832 758 365 893 265 924 385 789 425 728 935 728 395 728 945 782 958

PowerMod[a, p - 1, p]

Out[*]=
1

n =

**28 579 253 678 295 768 295 623 985 672 948 562 948 325 645 923 649 236 482 934 568 239 568 923 652 653 **
105 601

Out[]=*

28 579 253 678 295 768 295 623 985 672 948 562 948 325 645 923 649 236 482 934 568 239 568 923 652 653 \

105 601

PowerMod[a, n - 1, n]

Out[]=*

7 577 683 861 484 428 627 606 192 761 797 614 828 954 933 232 602 288 109 134 007 588 049 154 590 049 053 \

667

PrimeQ[p]

Out[]=*

True

PrimeQ[n]

Out[]=*

False