Finding Fractions In Other Bases

by Adi Cox 17-7-14

1/19 In Base 2

First find 19 in base 2:

```
19/2    =       9       rem 1
9/2     =       4       rem 1
4/2     =       2       rem 0
2/2     =       1       rem 0
1/2     =       0       rem 1

so 19 = 10011
```

Check the answer:

```
16      8       4       2       1
_______________________________________

1       0       0       1       1

16 +    0 +     0 +     2 +     1       =       19
```

Long division in binary:

```
                .                 .
            0.00001101011110010100001
           ____________________________
10011 | 1.00000000000000000000000
          10011
           11010
             1110
             11100
             10011
              10010
              100100
               10011
               100010
                10011
                 11110
                 10011
                  10110
                  10011
                     110
                     1100
```

```
                              11000
                              10011
                                  100
                                  1000
                                  10000
                                  100000
                                   10011

  .                   .
0.000011010111100101000011010111100101000011010111100101000011010111100101000
```

1/1	1/2	1/4	1/8	1/16	1/32	1/64	1/128	1/256	...
0.	0	0	0	0	1	1	0	1	...

If we add up the first 9 one digits in the infinite binary power series for 1/19 we get:

1/32+1/64+1/256+1/1024+1/2048+1/4096+1/8192+1/65536+1/262144 = 0.051166574

where 1/19 = 0.052631579

Using an iterative formula to find 1/19 In Base 2 I have written a program using

html.

To change the base in the html script below change the value of a
and to change the fraction change the value of b.

```
<!DOCTYPE HTML PUBLIC " - //W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd
">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>A for loop</title>
</head>
<body>
<script type="text/javascript" language="javascript">

document.write("<h3>In base a, one divided by b gives: 0.x1,x2,x3,... xn.<h3>")



a=2;
        document.write("a = ", a ,"<br />");
b=19;
        document.write("b = ", b ,"<br /><br />");
```

```
c1=a%b;

d1=a/b;

x1=d1-(c1/b)
        document.write("x1 = ", x1 ,"<br />");



c2=(c1*a)%b

d2=(c1*a)/b

x2=d2-(c2/b)
        document.write("x2 = ", x2 ,"<br />");



c3=(c2*a)%b

d3=(c2*a)/b

x3=d3-(c3/b)
        document.write("x3 = ", x3 ,"<br />");



c4=(c3*a)%b

d4=(c3*a)/b

x4=d4-(c4/b)
        document.write("x4 = ", x4 ,"<br />");



c5=(c4*a)%b

d5=(c4*a)/b

x5=d5-(c5/b)
        document.write("x5 = ", x5 ,"<br />");


c6=(c5*a)%b

d6=(c5*a)/b

x6=d6-(c6/b)
        document.write("x6 = ", x6 ,"<br />");


c7=(c6*a)%b

d7=(c6*a)/b

x7=d7-(c7/b)
        document.write("x7 = ", x7 ,"<br />");
```

```
c8=(c7*a)%b

d8=(c7*a)/b

x8=d8-(c8/b)
        document.write("x8 = ", x8 ,"<br />");



c9=(c8*a)%b

d9=(c8*a)/b

x9=d9-(c9/b)
        document.write("x9 = ", x9 ,"<br />");



c10=(c9*a)%b

d10=(c9*a)/b

x10=d10-(c10/b)
        document.write("x10 = ", x10 ,"<br />");



c11=(c10*a)%b;

d11=(c10*a)/b;

x11=d11-(c11/b)
        document.write("x11 = ", x11 ,"<br />");



c12=(c11*a)%b

d12=(c11*a)/b

x12=d12-(c12/b)
        document.write("x12 = ", x12 ,"<br />");



c13=(c12*a)%b

d13=(c12*a)/b

x13=d13-(c13/b)
        document.write("x13 = ", x13 ,"<br />");



c14=(c13*a)%b

d14=(c13*a)/b
```

```
x14=d14-(c14/b)
        document.write("x14 = ", x14 ,"<br />");



c15=(c14*a)%b

d15=(c14*a)/b

x15=d15-(c15/b)
        document.write("x15 = ", x15 ,"<br />");


c16=(c15*a)%b

d16=(c15*a)/b

x16=d16-(c16/b)
        document.write("x16 = ", x16 ,"<br />");


c17=(c16*a)%b

d17=(c16*a)/b

x17=d17-(c17/b)
        document.write("x17 = ", x17 ,"<br />");



c18=(c17*a)%b

d18=(c17*a)/b

x18=d18-(c18/b)
        document.write("x18 = ", x18 ,"<br />");



c19=(c18*a)%b

d19=(c18*a)/b

x19=d19-(c19/b)
        document.write("x19 = ", x19 ,"<br />");



c20=(c19*a)%b

d20=(c19*a)/b

x20=d20-(c20/b)
        document.write("x20 = ", x20 ,"<br />");



c21=(c20*a)%b

d21=(c20*a)/b
```

```
x21=d21-(c21/b)
        document.write("x21 = ", x21 ,"<br />");



c22=(c21*a)%b

d22=(c21*a)/b

x22=d22-(c22/b)
        document.write("x22 = ", x22 ,"<br />");



c23=(c22*a)%b

d23=(c22*a)/b

x23=d23-(c23/b)
        document.write("x23 = ", x23 ,"<br />");



c24=(c23*a)%b

d24=(c23*a)/b

x24=d24-(c24/b)
        document.write("x24 = ", x24 ,"<br />");



c25=(c24*a)%b

d25=(c24*a)/b

x25=d25-(c25/b)
        document.write("x25 = ", x25 ,"<br />");


c26=(c25*a)%b

d26=(c25*a)/b

x26=d26-(c26/b)
        document.write("x26 = ", x26 ,"<br />");


c27=(c26*a)%b

d27=(c26*a)/b

x27=d27-(c27/b)
        document.write("x27 = ", x27 ,"<br />");



c28=(c27*a)%b
```

```
d28=(c27*a)/b

x28=d28-(c28/b)
        document.write("x28 = ", x28 ,"<br />");



c29=(c28*a)%b

d29=(c28*a)/b

x29=d29-(c29/b)
        document.write("x29 = ", x29 ,"<br />");



c30=(c29*a)%b

d30=(c29*a)/b

x30=d30-(c30/b)
        document.write("x30 = ", x30 ,"<br />");



c31=(c30*a)%b

d31=(c30*a)/b

x31=d31-(c31/b)
        document.write("x31 = ", x31 ,"<br />");



c32=(c31*a)%b

d32=(c31*a)/b

x32=d32-(c32/b)
        document.write("x32 = ", x32 ,"<br />");



c33=(c32*a)%b

d33=(c32*a)/b

x33=d33-(c33/b)
        document.write("x33 = ", x33 ,"<br />");



c34=(c33*a)%b

d34=(c33*a)/b

x34=d34-(c34/b)
        document.write("x34 = ", x34 ,"<br />");
```

```
c35=(c34*a)%b

d35=(c34*a)/b

x35=d35-(c35/b)
        document.write("x35 = ", x35 ,"<br />");


c36=(c35*a)%b

d36=(c35*a)/b

x36=d36-(c36/b)
        document.write("x36 = ", x36 ,"<br />");


c37=(c36*a)%b

d37=(c36*a)/b

x37=d37-(c37/b)
        document.write("x37 = ", x37 ,"<br />");



c38=(c37*a)%b

d38=(c37*a)/b

x38=d38-(c38/b)
        document.write("x38 = ", x38 ,"<br />");



c39=(c38*a)%b

d39=(c38*a)/b

x39=d39-(c39/b)
        document.write("x39 = ", x39 ,"<br />");



c40=(c39*a)%b

d40=(c39*a)/b

x40=d40-(c40/b)
        document.write("x40 = ", x40 ,"<br />");



c41=(c40*a)%b

d41=(c40*a)/b

x41=d41-(c41/b)
        document.write("x41 = ", x41 ,"<br />");
```

```
c42=(c41*a)%b

d42=(c41*a)/b

x42=d42-(c42/b)
        document.write("x42 = ", x42 ,"<br />");



c43=(c42*a)%b

d43=(c42*a)/b

x43=d43-(c43/b)
        document.write("x43 = ", x43 ,"<br />");



c44=(c43*a)%b

d44=(c43*a)/b

x44=d44-(c44/b)
        document.write("x44 = ", x44 ,"<br />");



c45=(c44*a)%b

d45=(c44*a)/b

x45=d45-(c45/b)
        document.write("x45 = ", x45 ,"<br />");


c46=(c45*a)%b

d46=(c45*a)/b

x46=d46-(c46/b)
        document.write("x46 = ", x46 ,"<br />");


c47=(c46*a)%b

d47=(c46*a)/b

x47=d47-(c47/b)
        document.write("x47 = ", x47 ,"<br />");



c48=(c47*a)%b

d48=(c47*a)/b

x48=d48-(c48/b)
        document.write("x48 = ", x48 ,"<br />");
```

```
c49=(c48*a)%b

d49=(c48*a)/b

x49=d49-(c49/b)
        document.write("x49 = ", x49 ,"<br />");



c50=(c49*a)%b

d50=(c49*a)/b

x50=d50-(c50/b)
        document.write("x50 = ", x50 ,"<br />");



</script>
</body>
</html>
```

The output of the above html program is below

```
In base a, one divided by b gives: 0.x1,x2,x3,... xn.
a = 2
b = 19

x1 = 0
x2 = 0
x3 = 0
x4 = 0
x5 = 0.9999999999999999
x6 = 1
x7 = 0
x8 = 1
x9 = 0
x10 = 0.9999999999999999
x11 = 1
x12 = 1
x13 = 1
x14 = 0
x15 = 0
x16 = 1
x17 = 0
x18 = 1
x19 = 0
x20 = 0
x21 = 0
x22 = 0
x23 = 0.9999999999999999
```

```
x24 = 1
x25 = 0
x26 = 1
x27 = 0
x28 = 0.9999999999999999
x29 = 1
x30 = 1
x31 = 1
x32 = 0
x33 = 0
x34 = 1
x35 = 0
x36 = 1
x37 = 0
x38 = 0
x39 = 0
x40 = 0
x41 = 0.9999999999999999
x42 = 1
x43 = 0
x44 = 1
x45 = 0
x46 = 0.9999999999999999
x47 = 1
x48 = 1
x49 = 1
x50 = 0
```

Some of the x values in the output above have .9rec in their answers.

if x=0.9rec
and x + y = 1
what is the value of y?

x=0.9rec
10x=9.9rec
10x - x = 9
9x = 9
x = 1
therefore 0.9rec == 1

so if x = 0.9rec
y = 0
where x + y = 1

The following fractions below in their various bases have been found to 70 places by a modified version of the html program above.

FRACTIONS 1/x IN BASE 2

1/1	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/2	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/3	0.0101010101010101010101010101010101010101010101010101010101010101010101
1/4	0.0100000000000000000000000000000000000000000000000000000000000000000000
1/5	0.0011001100110011001100110011001100110011001100110011001100110011001100
1/6	0.0010101010101010101010101010101010101010101010101010101010101010101010
1/7	0.0010010010010010010010010010010010010010010010010010010010010010010010
1/8	0.0010000000000000000000000000000000000000000000000000000000000000000000
1/9	0.0001110001110001110001110001110001110001110001110001110001110001110001
1/10	0.0001100110011001100110011001100110011001100110011001100110011001100110
1/11	0.0001011101000101110100010111010001011101000101110100010111010001011101
1/12	0.0001010101010101010101010101010101010101010101010101010101010101010101
1/13	0.0001001110110001001110110001001110110001001110110001001110110001001110
1/14	0.0001001001001001001001001001001001001001001001001001001001001001001001
1/15	0.0001000100010001000100010001000100010001000100010001000100010001000100
1/16	0.0001000000000000000000000000000000000000000000000000000000000000000000
1/17	0.0000111100001111000011110000111100001111000011110000111100001111000011
1/18	0.0000111000111000111000111000111000111000111000111000111000111000111000
1/19	0.0000110101111001010000110101111001010000110101111001010000110101111001
1/20	0.0000110011001100110011001100110011001100110011001100110011001100110011
1/21	0.0000110000110000110000110000110000110000110000110000110000110000110000
1/22	0.0000101110100010111010001011101000101110100010111010001011101000101110
1/23	0.0000101100100001011001000010110010000101100100001011001000010110010000
1/24	0.0000101010101010101010101010101010101010101010101010101010101010101010
1/25	0.0000101000111101011100001010001111010111000010100011110101110000101000
1/26	0.0000100111011000100111011000100111011000100111011000100111011000100111
1/27	0.0000100101111011010000100101111011010000100101111011010000100101111011
1/28	0.0000100100100100100100100100100100100100100100100100100100100100100100
1/29	0.0000100011010011110111001011000010001101001111011100101100001000110100
1/30	0.0000100010001000100010001000100010001000100010001000100010001000100010
1/31	0.0000100001000010000100001000010000100001000010000100001000010000100001
1/32	0.0000100000000000000000000000000000000000000000000000000000000000000000
1/33	0.0000011111000001111100000111110000011111000001111100000111110000011111
1/34	0.0000011110000111100001111000011110000111100001111000011110000111100001
1/35	0.0000011101010000011101010000011101010000011101010000011101010000011101
1/36	0.0000011100011100011100011100011100011100011100011100011100011100011100
1/37	0.0000011011101011001111100100010100110000011011101011001111100100010100
1/38	0.0000011010111100101000011010111100101000011010111100101000011010111100
1/39	0.0000011010010000011010010000011010010000011010010000011010010000011010
1/40	0.0000011001100110011001100110011001100110011001100110011001100110011001
1/41	0.0000011000111110011100000110001111100111000001100011111001110000011000
1/42	0.0000011000011000011000011000011000011000011000011000011000011000011000
1/43	0.0000010111110100000101111101000001011111010000010111110100000101111101
1/44	0.0000010111010001011100010111010001011101000101110100010111010001011101
1/45	0.0000010110110000010110110000010110110000010110110000010110110000010110
1/46	0.0000010110010000101100100001011001000010110010000101100100001011001000
1/47	0.0000010101110010011000100000101011100100110001000001010111001001100010
1/48	0.0000010101010101010101010101010101010101010101010101010101010101010101
1/49	0.0000010100111001011110000010100111001011110000010100111001011110000010
1/50	0.0000010100011110101110000101000111101011100001010001111010111000010100

FRACTIONS 1/x IN BASE 3

1/1	0.2222222222222222222222222222222222222222222222222222222222222222222222
1/2	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/3	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/4	0.0202020202020202020202020202020202020202020202020202020202020202020202
1/5	0.0121012101210121012101210121012101210121012101210121012101210121012101
1/6	0.0111111111111111111111111111111111111111111111111111111111111111111111

1/7 0.0102120102120102120102120102120102120102120102120102120102120102120102
1/8 0.0101010101010101010101010101010101010101010101010101010101010101010101
1/9 0.0100000000000000000000000000000000000000000000000000000000000000000000
1/10 0.0022002200220022002200220022002200220022002200220022002200220022002200
1/11 0.0021100211002110021100211002110021100211002110021100211002110021100211
1/12 0.0020202020202020202020202020202020202020202020202020202020202020202020
1/13 0.0020020020020020020020020020020020020020020020020020020020020020020020
1/14 0.0012210012210012210012210012210012210012210012210012210012210012210012
1/15 0.0012101210121012101210121012101210121012101210121012101210121012101210
1/16 0.0012001200120012001200120012001200120012001200120012001200120012001200
1/17 0.0011202122110201001120212211020100112021221102010011202122110201001120
1/18 0.0011111111111111111111111111111111111111111111111111111111111111111111
1/19 0.0011021002211201220011021002211201220011021002211201220011021002211201
1/20 0.0011001100110011001100110011001100110011001100110011001100110011001100
1/21 0.0010212010212010212010212010212010212010212010212010212010212010212010
1/22 0.0010200102001020010200102001020010200102001020010200102001020010200102
1/23 0.0010112002100101120021001011200210010112002100101120021001011200210010
1/24 0.0010101010101010101010101010101010101010101010101010101010101010101010
1/25 0.0010020110221220211200100201102212202112001002011022122021120010020110
1/26 0.0010010010010010010010010010010010010010010010010010010010010010010010
1/27 0.0010000000000000000000000000000000000000000000000000000000000000000000
1/28 0.0002220002220002220002220002220002220002220002220002220002220002220002
1/29 0.0002210102011122200121202111000221010201112220012120211100022101020111
1/30 0.0002200220022002200220022002200220022002200220022002200220022002200220
1/31 0.0002121112210202220101110012020002121112210202220101110012020002121112
1/32 0.0002112100021121000211210002112100021121000211210002112100021121000211
1/33 0.0002110021100211002110021100211002110021100211002110021100211002110021
1/34 0.0002101022201212000210102220121200021010222012120002101022201212000210
1/35 0.0002022111010002022111010002022111010002022111010002022111010002022111
1/36 0.0002020202020202020202020202020202020202020202020202020202020202020202
1/37 0.0002012002220210220002012002220210220002012002220210220002012002220210
1/38 0.0002010112220212110002010112220212110002010112220212110002010112220212
1/39 0.0002002002002002002002002002002002002002002002002002002002002002002002
1/40 0.0002000200020002000200020002000200020002000200020002000200020002000200
1/41 0.0001222100012221000122210001222100012221000122210001222100012221000122
1/42 0.0001221001221001221001221001221001221001221001221001221001221001221001
1/43 0.0001212212020021112102221010010202201110120001212212020021112102221010
1/44 0.0001211201000121120100012112010001211201000121120100012112010001211201
1/45 0.0001210121012101210121012101210121012101210121012101210121012101210121
1/46 0.0001202112200012021122000120211220001202112200012021122000120211220001
1/47 0.0001201112100202200101100012011121002022001011000120111210020220010110
1/48 0.0001200120012001200120012001200120012001200120012001200120012001200120
1/49 0.0001122122002012111202221100100220210111020001122122002012111202221100
1/50 0.0001121201222110102100011212012221101021000112120122211010210001121201

FRACTIONS 1/x IN BASE 4

1/1 0.3333333333333333333333333333333333333333333333333333333333333333333333
1/2 0.2000000000000000000000000000000000000000000000000000000000000000000000
1/3 0.1111111111111111111111111111111111111111111111111111111111111111111111
1/4 0.1000000000000000000000000000000000000000000000000000000000000000000000
1/5 0.0303030303030303030303030303030303030303030303030303030303030303030303
1/6 0.0222222222222222222222222222222222222222222222222222222222222222222222
1/7 0.0210210210210210210210210210210210210210210210210210210210210210210210
1/8 0.0200000000000000000000000000000000000000000000000000000000000000000000
1/9 0.0130130130130130130130130130130130130130130130130130130130130130130130
1/10 0.0121212121212121212121212121212121212121212121212121212121212121212121
1/11 0.0113101131011310113101131011310113101131011310113101131011310113101131
1/12 0.0111111111111111111111111111111111111111111111111111111111111111111111

1/13	0.0103230103230103230103230103230103230103230103230103230103230103230103
1/14	0.0102102102102102102102102102102102102102102102102102102102102102102102
1/15	0.0101010101010101010101010101010101010101010101010101010101010101010101
1/16	0.0100000000000000000000000000000000000000000000000000000000000000000000
1/17	0.0033003300330033003300330033003300330033003300330033003300330033003300
1/18	0.0032032032032032032032032032032032032032032032032032032032032032032032
1/19	0.0031132110031132110031132110031132110031132110031132110031132110031132
1/20	0.0030303030303030303030303030303030303030303030303030303030303030303030
1/21	0.0030030030030030030030030030030030030030030030030030030030030030030030
1/22	0.0023220232202322023220232202322023220232202322023220232202322023220232
1/23	0.0023020112100230201121002302011210023020112100230201121002302011210023
1/24	0.0022222222222222222222222222222222222222222222222222222222222222222222
1/25	0.0022033113002203311300220331130022033113002203311300220331130022033113
1/26	0.0021312021312021312021312021312021312021312021312021312021312021312021
1/27	0.0021132310021132310021132310021132310021132310021132310021132310021132
1/28	0.0021021021021021021021021021021021021021021021021021021021021021021021
1/29	0.0020310331302300203103313023000203103313023000203103313023000203103313023
1/30	0.0020202020202020202020202020202020202020202020202020202020202020202020
1/31	0.0020100201002010020100201002010020100201002010020100201002010020100201
1/32	0.0020000000000000000000000000000000000000000000000000000000000000000000
1/33	0.0013300133001330013300133001330013300133001330013300133001330013300133
1/34	0.0013201320132013201320132013201320132013201320132013201320132013201320
1/35	0.0013110013110013110013110013110013110013110013110013110013110013110013
1/36	0.0013013013013013013013013013013013013013013013013013013013013013013013
1/37	0.0012322303321011030012322303321011030012322303321011030012322303321011
1/38	0.0012233022012233022012233022012233022012233022012233022012233022012233
1/39	0.0012210012210012210012210012210012210012210012210012210012210012210012
1/40	0.0012121212121212121212121212121212121212121212121212121212121212121212
1/41	0.0012033213001203321300120332130012033213001203321300120332130012033213
1/42	0.0012012012012012012012012012012012012012012012012012012012012012012012
1/43	0.0011331001133100113310011331001133100113310011331001133100113310011331
1/44	0.0011310113101131011310113101131011310113101131011310113101131011310113
1/45	0.0011230011230011230011230011230011230011230011230011230011230011230011
1/46	0.0011210023020112100230201121002302011210023020112100230201121002302011
1/47	0.0011130212020022321030100111302120200223210301001113021202002232103010
1/48	0.0011111111111111111111111111111111111111111111111111111111111111111111
1/49	0.0011032113200221302330011032113200221302330011032113200221302330011032
1/50	0.0011013223201101322320110132232011013223201101322320110132232011013223

FRACTIONS 1/x IN BASE 5

1/1	0.4444444444444444444444444444444444444444444444444444444444444444444444
1/2	0.2222222222222222222222222222222222222222222222222222222222222222222222
1/3	0.1313131313131313131313131313131313131313131313131313131313131313131313
1/4	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/5	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/6	0.0404040404040404040404040404040404040404040404040404040404040404040404
1/7	0.0324120324120324120324120324120324120324120324120324120324120324120324
1/8	0.0303030303030303030303030303030303030303030303030303030303030303030303
1/9	0.0234210234210234210234210234210234210234210234210234210234210234210234
1/10	0.0222222222222222222222222222222222222222222222222222222222222222222222
1/11	0.0211402114021140211402114021140211402114021140211402114021140211402114
1/12	0.0202020202020202020202020202020202020202020202020202020202020202020202
1/13	0.0143014301430143014301430143014301430143014301430143014301430143014301
1/14	0.0134310134310134310134310134310134310134310134310134310134310134310134
1/15	0.0131313131313131313131313131313131313131313131313131313131313131313131
1/16	0.0124012401240124012401240124012401240124012401240124012401240124012401
1/17	0.0121340243231042012134024323104201213402432310420121340243231042012134

1/18	0.0114330114330114330114330114330114330114330114330114330114330114330114
1/19	0.0112421410112421410112421410112421410112421410112421410112421410112421
1/20	0.0111111111111111111111111111111111111111111111111111111111111111111111
1/21	0.0104340104340104340104340104340104340104340104340104340104340104340104
1/22	0.0103201032010320103201032010320103201032010320103201032010320103201032
1/23	0.0102041332143424031123010204133214342403112301020413321434240311230102
1/24	0.0101010101010101010101010101010101010101010101010101010101010101010101
1/25	0.0100000000000000000000000000000000000000000000000000000000000000000000
1/26	0.0044004400440044004400440044004400440044004400440044004400440044004400
1/27	0.0043033224401411220043033224401411220043033224401411220043033224401411
1/28	0.0042130042130042130042130042130042130042130042130042130042130042130042
1/29	0.0041233440321100412334403211004123344032110041233440321100412334403211
1/30	0.0040404040404040404040404040404040404040404040404040404040404040404040
1/31	0.0040040040040040040040040040040040040040040040040040040040040040040040
1/32	0.0034231200342312003423120034231200342312003423120034231200342312003423
1/33	0.0033432203003343220300334322030033432203003343220300334322030033432203
1/34	0.0033142344113021003314234411302100331423441130210033142344113021003314
1/35	0.0032412032412032412032412032412032412032412032412032412032412032412032
1/36	0.0032140032140032140032140032140032140032140032140032140032140032140032
1/37	0.0031421220401133424413023224043311020031421220401133424413023224043311
1/38	0.0031210430031210430031210430031210430031210430031210430031210430031210
1/39	0.0031003100310031003100310031003100310031003100310031003100310031003100
1/40	0.0030303030303030303030303030303030303030303030303030303030303030303030
1/41	0.0030110220441433422400301102204414334224003011022044143342240030110220
1/42	0.0024420024420024420024420024420024420024420024420024420024420024420024
1/43	0.0024231412234340431114420213032210104013330024231412234340431114420213
1/44	0.0024100241002410024100241002410024100241002410024100241002410024100241
1/45	0.0023421023421023421023421023421023421023421023421023421023421023421023
1/46	0.0023243141044212013034002324314104421201303400232431410442120130340023
1/47	0.0023122104111424140101244213223403330203043432002312210411142414010124
1/48	0.0023002300230023002300230023002300230023002300230023002300230023002300
1/49	0.0022334143213314042434422110301231130402010022334143213314042434422110
1/50	0.0022222222222222222222222222222222222222222222222222222222222222222222

FRACTIONS 1/x IN BASE 6

1/1	0.5555555555555555555555555555555555555555555555555555555555555555555555
1/2	0.3000000000000000000000000000000000000000000000000000000000000000000000
1/3	0.2000000000000000000000000000000000000000000000000000000000000000000000
1/4	0.1300000000000000000000000000000000000000000000000000000000000000000000
1/5	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/6	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/7	0.0505050505050505050505050505050505050505050505050505050505050505050505
1/8	0.0430000000000000000000000000000000000000000000000000000000000000000000
1/9	0.0400000000000000000000000000000000000000000000000000000000000000000000
1/10	0.0333333333333333333333333333333333333333333333333333333333333333333333
1/11	0.0313452421031345242103134524210313452421031345242103134524210313452421
1/12	0.0300000000000000000000000000000000000000000000000000000000000000000000
1/13	0.0243405312150243405312150243405312150243405312150243405312150243405312
1/14	0.0232323232323232323232323232323232323232323232323232323232323232323232
1/15	0.0222222222222222222222222222222222222222222222222222222222222222222222
1/16	0.0213000000000000000000000000000000000000000000000000000000000000000000
1/17	0.0204122453514331020412245351433102041224535143310204122453514331020412
1/18	0.0200000000000000000000000000000000000000000000000000000000000000000000
1/19	0.0152113250152113250152113250152113250152113250152113250152113250152113
1/20	0.0144444444444444444444444444444444444444444444444444444444444444444444
1/21	0.0141414141414141414141414141414141414141414141414141414141414141414141
1/22	0.0134524210313452421031345242103134524210313452421031345242103134524210

1/23	0.0132203044101322030441013220304410132203044101322030441013220304410132
1/24	0.0130000000000000000000000000000000000000000000000000000000000000000000
1/25	0.0123501235012350123501235012350123501235012350123501235012350123501235
1/26	0.0121502434053121502434053121502434053121502434053121502434053121502434
1/27	0.0120000000000000000000000000000000000000000000000000000000000000000000
1/28	0.0114141414141414141414141414141414141414141414141414141414141414141414
1/29	0.0112404544315101124045443151011240454431510112404544315101124045443151
1/30	0.0111111111111111111111111111111111111111111111111111111111111111111111
1/31	0.0105450105450105450105450105450105450105450105450105450105450105450105
1/32	0.0104300000000000000000000000000000000000000000000000000000000000000000
1/33	0.0103134524210313452421031345242103134524210313452421031345242103134524
1/34	0.0102041224535143310204122453514331020412245351433102041224535143310204
1/35	0.0101010101010101010101010101010101010101010101010101010101010101010101
1/36	0.0100000000000000000000000000000000000000000000000000000000000000000000
1/37	0.0055005500550055005500550055005500550055005500550055005500550055005500
1/38	0.0054034423054034423054034423054034423054034423054034423054034423054034
1/39	0.0053121502434053121502434053121502434053121502434053121502434053121502
1/40	0.0052222222222222222222222222222222222222222222222222222222222222222222
1/41	0.0051335412440330234455042201431152253211005133541244033023445504220143
1/42	0.0050505050505050505050505050505050505050505050505050505050505050505050
1/43	0.0050050050050050050050050050050050050050050050050050050050050050050050
1/44	0.0045242103134524210313452421031345242103134524210313452421031345242103
1/45	0.0044444444444444444444444444444444444444444444444444444444444444444444
1/46	0.0044101322030441013220304410132203044101322030441013220304410132203044
1/47	0.0043324030214420131052100433240302144201310521004332403021442013105210
1/48	0.0043000000000000000000000000000000000000000000000000000000000000000000
1/49	0.0042240551331500422405513315004224055133150042240551331500422405513315
1/50	0.0041530415304153041530415304153041530415304153041530415304153041530415

FRACTIONS 1/x IN BASE 7

1/1	0.6666666666666666666666666666666666666666666666666666666666666666666666
1/2	0.3333333333333333333333333333333333333333333333333333333333333333333333
1/3	0.2222222222222222222222222222222222222222222222222222222222222222222222
1/4	0.1515151515151515151515151515151515151515151515151515151515151515151515
1/5	0.1254125412541254125412541254125412541254125412541254125412541254125412
1/6	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/7	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/8	0.0606060606060606060606060606060606060606060606060606060606060606060606
1/9	0.0530530530530530530530530530530530530530530530530530530530530530530530
1/10	0.0462046204620462046204620462046204620462046204620462046204620462046204
1/11	0.0431162355043116235504311623550431162355043116235504311623550431162355
1/12	0.0404040404040404040404040404040404040404040404040404040404040404040404
1/13	0.0352456314210352456314210352456314210352456314210352456314210352456314
1/14	0.0333333333333333333333333333333333333333333333333333333333333333333333
1/15	0.0316031603160316031603160316031603160316031603160316031603160316031603
1/16	0.0303030303030303030303030303030303030303030303030303030303030303030303
1/17	0.0261143464055232026114346405523202611434640552320261143464055232026114
1/18	0.0250250250250250250250250250250250250250250250250250250250250250250250
1/19	0.0244444444444444444444444444444444444444444444444444444444444444444444
1/20	0.0231023102310231023102310231023102310231023102310231023102310231023102
1/21	0.0222222222222222222222222222222222222222222222222222222222222222222222
1/22	0.0214064526021406452602140645260214064526021406452602140645260214064526
1/23	0.0206251134364604155323020625113436460415532302062511343646041553230206
1/24	0.0202020202020202020202020202020202020202020202020202020202020202020202
1/25	0.0165016501650165016501650165016501650165016501650165016501650165016501
1/26	0.0161226505440161226505440161226505440161226505440161226505440161226505
1/27	0.0154632410154632410154632410154632410154632410154632410154632410154632

1/28 0.015151515151515151515151515151515151515151515151515151515151515151515151
1/29 0.014553601455360145536014553601455360145536014553601455360145536014553601455360145536
1/30 0.014301430143014301430143014301430143014301430143014301430143014301430143014301
1/31 0.014031062154342014031062154342014031062154342014031062154342014031062154342014031062
1/32 0.013501350135013501350135013501350135013501350135013501350135013501350135013501
1/33 0.013252056401325205640132520564013252056401325205640132520564013252056401325205640
1/34 0.013042156536245101304215653624510130421565362451013042156536245101304215653624510130
1/35 0.012541254125412541254125412541254125412541254125412541254125412541254125412541
1/36 0.012346012346012346012346012346012346012346012346012346012346012346012346012346012
1/37 0.012161463012161463012161463012161463012161463012161463012161463012161463012161463012161
1/38 0.012012012012012012012012012012012012012012012012012012012012012012012012012012
1/39 0.011536432605011536432605011536432605011536432605011536432605011536432605011536432
1/40 0.011401140114011401140114011401140114011401140114011401140114011401140114011401
1/41 0.011236326213520225056554303404531464416101123632621352022505655430340453146441610112363262135202250565543034
1/42 0.011111111111111111111111111111111111111111111111111111111111111111111111111111
1/43 0.010656010656010656010656010656010656010656010656010656010656010656010656010656010
1/44 0.010536561301053656130105365613010536561301053656130105365613010536561301053656130
1/45 0.010423264552010423264552010423264552010423264552010423264552010423264552010423264
1/46 0.010312405216563542614501031240521656354261450103124052165635426145010312405216563542614501
1/47 0.010204112245235030615340102041122452350306153401020411224523503061534010204112245235030615340
1/48 0.010101010101010101010101010101010101010101010101010101010101010101010101010101
1/49 0.010000000000000000000000000000000000000000000000000000000000000000000000000000
1/50 0.006600660066006600660066006600660066006600660066006600660066006600660066006600

FRACTIONS 1/x IN BASE 8

1/1 0.777777777777777777777777777777777777777777777777777777777777777777777777
1/2 0.400000000000000000000000000000000000000000000000000000000000000000000000
1/3 0.252525252525252525252525252525252525252525252525252525252525252525252525
1/4 0.200000000000000000000000000000000000000000000000000000000000000000000000
1/5 0.146314631463146314631463146314631463146314631463146314631463146314631463146314
1/6 0.125252525252525252525252525252525252525252525252525252525252525252525252525252
1/7 0.111111111111111111111111111111111111111111111111111111111111111111111111111111
1/8 0.100000000000000000000000000000000000000000000000000000000000000000000000000000
1/9 0.070707070707070707070707070707070707070707070707070707070707070707070707070707
1/10 0.063146314631463146314631463146314631463146314631463146314631463146314631463146
1/11 0.056427213505642721350564272135056427213505642721350564272135056427213505642721350
1/12 0.052525252525252525252525252525252525252525252525252525252525252525252525252525
1/13 0.047304730473047304730473047304730473047304730473047304730473047304730473047304
1/14 0.044444444444444444444444444444444444444444444444444444444444444444444444444444
1/15 0.042104210421042104210421042104210421042104210421042104210421042104210421042104
1/16 0.040000000000000000000000000000000000000000000000000000000000000000000000000000
1/17 0.036074170360741703607417036074170360741703607417036074170360741703607417036074
1/18 0.034343434343434343434343434343434343434343434343434343434343434343434343434343
1/19 0.032745032745032745032745032745032745032745032745032745032745032745032745032745032
1/20 0.031463146314631463146314631463146314631463146314631463146314631463146314631463
1/21 0.030303030303030303030303030303030303030303030303030303030303030303030303030303
1/22 0.027213505642721350564272135056427213505642721350564272135056427213505642721350
1/23 0.026205441310262054413102620544131026205441310262054413102620544131026205441310262
1/24 0.025252525252525252525252525252525252525252525252525252525252525252525252525252
1/25 0.024365605075341217270243656050753412172702436560507534121727024365605075341217270243656050
1/26 0.023542354235423542354235423542354235423542354235423542354235423542354235423542
1/27 0.022755022755022755022755022755022755022755022755022755022755022755022755022755022
1/28 0.022222222222222222222222222222222222222222222222222222222222222222222222222222
1/29 0.021517345410647562604323671302151734541064756260432367130215173454106475626043236713021517345410 64
1/30 0.021042104210421042104210421042104210421042104210421042104210421042104210421042
1/31 0.020410204102041020410204102041020410204102041020410204102041020410204102041020410204102041
1/32 0.020000000000000000000000000000000000000000000000000000000000000000000000000000

1/33	0.017407603701740760370174076037017407603701740760370174076037
1/34	0.017036074170360741703607417036074170360741703607417036074170 36
1/35	0.016501650165016501650165016501650165016501650165016501650165016501
1/36	0.016161616161616161616161616161616161616161616161616161616161616161
1/37	0.015654762123015654762123015654762123015654762123015654762123015654 7621
1/38	0.015362415362415362415362415362415362415362415362415362415362415362 4153
1/39	0.015151515151515151515151515151515151515151515151515151515151515151
1/40	0.014631463146314631463146314631463146314631463146314631463146314631
1/41	0.014371603076340617470143716030763406174701437160307634061747014371 6030
1/42	0.014141414141414141414141414141414141414141414141414141414141414141
1/43	0.013720276405750137202764057501372027640575013720276405750137202764 0575
1/44	0.013505642721350564272135056427213505642721350564272135056427213505 6427
1/45	0.013301330133013301330133013301330133013301330133013301330133013301
1/46	0.013102620544131026205441310262054413102620544131026205441310262054 4131
1/47	0.012711420256230405344610127114202562304053446101271142025623040534 4610
1/48	0.012525252525252525252525252525252525252525252525252525252525252525
1/49	0.012345701234570123457012345701234570123457012345701234570123457012 3457
1/50	0.012172702436560507534121727024365605075341217270243656050753412172 7024

FRACTIONS 1/x IN BASE 9

1/1	0.888888888888888888888888888888888888888888888888888888888888888888
1/2	0.444444444444444444444444444444444444444444444444444444444444444444
1/3	0.300000000000000000000000000000000000000000000000000000000000000000
1/4	0.222222222222222222222222222222222222222222222222222222222222222222
1/5	0.171717171717171717171717171717171717171717171717171717171717171717
1/6	0.144444444444444444444444444444444444444444444444444444444444444444
1/7	0.125125125125125125125125125125125125125125125125125125125125125125 1
1/8	0.111111111111111111111111111111111111111111111111111111111111111111
1/9	0.100000000000000000000000000000000000000000000000000000000000000000
1/10	0.080808080808080808080808080808080808080808080808080808080808080808
1/11	0.073240732407324073240732407324073240732407324073240732407324073240 7324
1/12	0.066666666666666666666666666666666666666666666666666666666666666666
1/13	0.062062062062062062062062062062062062062062062062062062062062062062 0620
1/14	0.057057057057057057057057057057057057057057057057057057057057057057 0570
1/15	0.053535353535353535353535353535353535353535353535353535353535353535
1/16	0.050505050505050505050505050505050505050505050505050505050505050505
1/17	0.046784210467842104678421046784210467842104678421046784210467842104 6784
1/18	0.044444444444444444444444444444444444444444444444444444444444444444
1/19	0.042327518042327518042327518042327518042327518042327518042327518042 3275
1/20	0.040404040404040404040404040404040404040404040404040404040404040404
1/21	0.037637637637637637637637637637637637637637637637637637637637637637 6376
1/22	0.036120361203612036120361203612036120361203612036120361203612036120 3612
1/23	0.034623115070346231150703462311507034623115070346231150703462311507 0346
1/24	0.033333333333333333333333333333333333333333333333333333333333333333
1/25	0.032138567503213856750321385675032138567503213856750321385675032138 5675
1/26	0.031031031031031031031031031031031031031031031031031031031031031031 0310
1/27	0.030000000000000000000000000000000000000000000000000000000000000000
1/28	0.028028028028028028028028028028028028028028028028028028028028028028 0280
1/29	0.027121486176740271214861767402712148617674027121486176740271214861 7674
1/30	0.026262626262626262626262626262626262626262626262626262626262626262
1/31	0.025457228114052025457228114052025457228114052025457228114052025457 2281
1/32	0.024702470247024702470247024702470247024702470247024702470247024702
1/33	0.024073240732407324073240732407324073240732407324073240732407324073 2407
1/34	0.023386550233865502338655023386550233865502338655023386550233865502 3386
1/35	0.022741022741022741022741022741022741022741022741022741022741022741 0227
1/36	0.022222222222222222222222222222222222222222222222222222222222222222
1/37	0.021628238021628238021628238021628238021628238021628238021628238021 6282

1/38	0.0211582540211582540211582540211582540211582540211582540211582540211582
1/39	0.0206206206206206206206206206206206206206206206206206206206206206206206
1/40	0.0202020202020202020202020202020202020202020202020202020202020202020202
1/41	0.0187018701870187018701870187018701870187018701870187018701870187018701
1/42	0.0183183183183183183183183183183183183183183183183183183183183183183183
1/43	0.0178520747283312264350178520747283312264350178520747283312264350178520
1/44	0.0175101751017510175101751017510175101751017510175101751017510175101751
1/45	0.0171717171717171717171717171717171717171717171717171717171717171717171
1/46	0.0167560524801675605248016756052480167560524801675605248016756052480167
1/47	0.0164532261130514706803401645322611305147068034016453226113051470680340
1/48	0.0161616161616161616161616161616161616161616161616161616161616161616161
1/49	0.0157806545284032671420157806545284032671420157806545284032671420157806
1/50	0.0155187337015518733701551873370155187337015518733701551873370155187337

FRACTIONS 1/x IN BASE 10

1/1	0.9999999999999999999999999999999999999999999999999999999999999999999999
1/2	0.5000000000000000000000000000000000000000000000000000000000000000000000
1/3	0.3333333333333333333333333333333333333333333333333333333333333333333333
1/4	0.2500000000000000000000000000000000000000000000000000000000000000000000
1/5	0.2000000000000000000000000000000000000000000000000000000000000000000000
1/6	0.1666666666666666666666666666666666666666666666666666666666666666666666
1/7	0.1428571428571428571428571428571428571428571428571428571428571428571428
1/8	0.1250000000000000000000000000000000000000000000000000000000000000000000
1/9	0.1111111111111111111111111111111111111111111111111111111111111111111111
1/10	0.1000000000000000000000000000000000000000000000000000000000000000000000
1/11	0.0909090909090909090909090909090909090909090909090909090909090909090909
1/12	0.0833333333333333333333333333333333333333333333333333333333333333333333
1/13	0.0769230769230769230769230769230769230769230769230769230769230769230769
1/14	0.0714285714285714285714285714285714285714285714285714285714285714285714
1/15	0.0666666666666666666666666666666666666666666666666666666666666666666666
1/16	0.0625000000000000000000000000000000000000000000000000000000000000000000
1/17	0.0588235294117647058823529411764705882352941176470588235294117647058823
1/18	0.0555555555555555555555555555555555555555555555555555555555555555555555
1/19	0.0526315789473684210526315789473684210526315789473684210526315789473684
1/20	0.0500000000000000000000000000000000000000000000000000000000000000000000
1/21	0.0476190476190476190476190476190476190476190476190476190476190476190476
1/22	0.0454545454545454545454545454545454545454545454545454545454545454545454
1/23	0.0434782608695652173913043478260869565217391304347826086956521739130434
1/24	0.0416666666666666666666666666666666666666666666666666666666666666666666
1/25	0.0400000000000000000000000000000000000000000000000000000000000000000000
1/26	0.0384615384615384615384615384615384615384615384615384615384615384615384
1/27	0.0370370370370370370370370370370370370370370370370370370370370370370370
1/28	0.0357142857142857142857142857142857142857142857142857142857142857142857
1/29	0.0344827586206896551724137931034482758620686551724137931034482758620689
1/30	0.0333333333333333333333333333333333333333333333333333333333333333333333
1/31	0.0322580645161290322580645161290322580645161290322580645161290322580645
1/32	0.0312500000000000000000000000000000000000000000000000000000000000000000
1/33	0.0303030303030303030303030303030303030303030303030303030303030303030303
1/34	0.0294117647058823529411764705882352941176470588235294117647058823529411
1/35	0.0285714285714285714285714285714285714285714285714285714285714285714285
1/36	0.0277777777777777777777777777777777777777777777777777777777777777777777
1/37	0.0270270270270270270270270270270270270270270270270270270270270270270270
1/38	0.0263157894736842105263157894736842105263157894736842105263157894736842
1/39	0.0256410256410256410256410256410256410256410256410256410256410256410256
1/40	0.0250000000000000000000000000000000000000000000000000000000000000000000
1/41	0.0243902439024390243902439024390243902439024390243902439024390243902439
1/42	0.0238095238095238095238095238095238095238095238095238095238095238095238

```
1/43    0.023255813953488372093023255813953488372093023255813953488372093023255 8
1/44    0.022727272727272727272727272727272727272727272727272727272727272727272 7
1/45    0.022222222222222222222222222222222222222222222222222222222222222222222 2
1/46    0.021739130434782608695652173913043478260869565217
1/47    0.021276595744680851063829787234042553191489361702127659574468085106382 9
1/48    0.020833333333333333333333333333333333333333333333333333333333333333333 3
1/49    0.020408163265306122448979591836734693877551020408163265306122448979591 8
1/50    0.020000000000000000000000000000000000000000000000000000000000000000000
```

FRACTIONS 1/x IN BASE 11

```
1/1     0.AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
1/2     0.5555555555555555555555555555555555555555555555555555555555555555555555
1/3     0.3737373737373737373737373737373737373737373737373737373737373737373737
1/4     0.2828282828282828282828282828282828282828282828282828282828282828282828
1/5     0.2222222222222222222222222222222222222222222222222222222222222222222222
1/6     0.1919191919191919191919191919191919191919191919191919191919191919191919
1/7     0.1663163163163163163163163613613613163163163163163163163163613613613163
1/8     0.1414141414141414141414141414141414141414141414141414141414141414141414
1/9     0.1249861249861249861249861249861249861249861249861249861249861249861249
1/10    0.1111111111111111111111111111111111111111111111111111111111111111111111
1/11    0.1000000000000000000000000000000000000000000000000000000000000000000000
1/12    0.0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A0A
1/13    0.093425A17685093425A17685093425A17685093425A17685093425A17685093425A176
1/14    0.0870870870870870870870870870870870870870870870870870870870870870870870
1/15    0.0808080808080808080808080808080808080808080808080808080808080808080808
1/16    0.0762076207620762076207620762076207620762076207620762076207620762076207
1/17    0.07132651A397845907132651A397845907132651A397845907132651A3978459071326
1/18    0.067A43067A43067A43067A43067A43067A43067A43067A43067A43067A43067A43067A
1/19    0.0640640640640640640640640640640640640640640640640640640640640640640640
1/20    0.0606060606060606060606060606060606060606060606060606060606060606060606
1/21    0.0584210584210584210584210584210584210584210584210584210584210584210584
1/22    0.0555555555555555555555555555555555555555555555555555555555555555555555
1/23    0.05296243390A581486771A05296243390A581486771A05296243390A581486771A0529
1/24    0.0505050505050505050505050505050505050505050505050505050505050505050505
1/25    0.0492704927049270492704927049270492704927049270492704927049270492704927
1/26    0.047212A63898047212A63898047212A63898047212A63898047212A63898047212A638
1/27    0.0453294081065781610204532940810657816102045329408106578161020453294081
1/28    0.0435990435990435990435990435990435990435990435990435990435990435990435
1/29    0.0419953460838710691157641027230419953460838710691157641027230419953460
1/30    0.0404040404040404040404040404040404040404040404040404040404040404040404
1/31    0.039A32146818574A71078964292536039A32146818574A71078964292536039A321468
1/32    0.0386593103865931038659310386593103865931038659310386593103865931038659
1/33    0.0373737373737373737373737373737373737373737373737373737373737373737373
1/34    0.0361688010749422100361688010749422100361688010749422100361688010749422
1/35    0.0350350350350350350350350350350350350350350350350350350350350350350350
1/36    0.033A77033A77033A77033A77033A77033A77033A77033A77033A77033A77033A77033A
1/37    0.0321078032107803210780321078032107803210780321078032107803210780321078
1/38    0.0320320320320320320320320320320320320320320320320320320320320320320320
1/39    0.0311457062290311457062290311457062290311457062290311457062290311457062
1/40    0.0303030303030303030303030303030303030303030303030303030303030303030303
1/41    0.02A51089432461972756A8059A2167864913835402A51089432461972756A8059A2167
1/42    0.0297660297660297660297660297660297660297660297660297660297660297660297
1/43    0.028A541028A541028A541028A541028A541028A541028A541028A541028A541028A541
1/44    0.0282828282828282828282828282828282828282828282828282828282828282828282
1/45    0.02763A02763A02763A02763A02763A02763A02763A02763A02763A02763A02763A0276
1/46    0.026A3121745A8407989365026A3121745A8407989365026A3121745A8407989365026A
1/47    0.02635687289914 4A077A593A847542382119660A3305170263568728991 44A077A593A
```

1/48	0.02580258025802580258025802580258025802580258025802580258025802580258025802
1/49	0.02518834041036568099720251883404103656809972025188340410365680997202 51
1/50	0.02469024690246902469024690246902469024690246902469024690246902469024690246902469

FRACTIONS 1/x IN BASE 12

1/1	0.BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB
1/2	0.60000000000000000000000000000000000000000000000000000000000000000000000000
1/3	0.40000000000000000000000000000000000000000000000000000000000000000000000000
1/4	0.30000000000000000000000000000000000000000000000000000000000000000000000000
1/5	0.24972497249724972497249724972497249724972497249724972497249724972497249724
1/6	0.20000000000000000000000000000000000000000000000000000000000000000000000000
1/7	0.186A35186A35186A35186A35186A35186A35186A35186A35186A35186A35186A35186A
1/8	0.16000000000000000000000000000000000000000000000000000000000000000000000000
1/9	0.14000000000000000000000000000000000000000000000000000000000000000000000000
1/10	0.12497249724972497249724972497249724972497249724972497249724972497249724972
1/11	0.11111111111111111111111111111111111111111111111111111111111111111111111111
1/12	0.10000000000000000000000000000000000000000000000000000000000000000000000000
1/13	0.0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B
1/14	0.01035186010351860103518601035186010351860103518601035186010351860103518601
1/15	0.09724972497249724972497249724972497249724972497249724972497249724972497249
1/16	0.09000000000000000000000000000000000000000000000000000000000000000000000000
1/17	0.08579214B36429A708579214B36429A708579214B36429A708579214B36429A7085792
1/18	0.08000000000000000000000000000000000000000000000000000000000000000000000000
1/19	0.076B45076B45076B45076B45076B45076B45076B45076B45076B45076B45076B45076B
1/20	0.07249724972497249724972497249724972497249724972497249724972497249724972497
1/21	0.06A35186A35186A35186A35186A35186A35186A35186A35186A35186A35186A35186A3
1/22	0.06666666666666666666666666666666666666666666666666666666666666666666666666
1/23	0.06316948421063169484210631694842106316948421063169484210631694842106316 31
1/24	0.06000000000000000000000000000000000000000000000000000000000000000000000000
1/25	0.05915343A0B621068781B05915343A0B621068781B05915343A0B621068781B0591534
1/26	0.05656565656565656565656565656565656565656565656565656565656565656565656565
1/27	0.05400000000000000000000000000000000000000000000000000000000000000000000000
1/28	0.05186A35186A35186A35186A35186A35186A35186A35186A35186A35186A35186A3518
1/29	0.04B704B704B704B704B704B704B704B704B704B704B704B704B704B704B704B704
1/30	0.04972497249724972497249724972497249724972497249724972497249724972497249724
1/31	0.0478AA093598166B74311B28623A550478AA093598166B74311B28623A550478AA0935
1/32	0.04600000000000000000000000000000000000000000000000000000000000000000000000
1/33	0.04444444444444444444444444444444444444444444444444444444444444444444444444
1/34	0.0429A708579214B36429A708579214B36429A708579214B36429A708579214B36429A7
1/35	0.0414559B39310414559B39310414559B39310414559B39310414559B39310414559B39
1/36	0.04000000000000000000000000000000000000000000000000000000000000000000000000
1/37	0.03A85232B03A85232B03A85232B03A85232B03A85232B03A85232B03A85232B03A8523
1/38	0.03958263958263958263958263958263958263958263958263958263958263958263958263 95
1/39	0.03838383838383838383838383838383838383838383838383838383838383838383838383
1/40	0.03724972497249724972497249724972497249724972497249724972497249724972497249
1/41	0.036190A653277397A9B4B85A2B1568944824120703619 0A653277397A9B4B85A2B1568
1/42	0.03518610351861035186103518610351861035186103518610351861035186103518610351861
1/43	0.0342295A3AA730A068456B879926181148B1B537650342295A3AA730A068456B879926
1/44	0.03333333333333333333333333333333333333333333333333333333333333333333333333
1/45	0.03249724972497249724972497249724972497249724972497249724972497249724972497
1/46	0.03169484210631694842106316948421063169484210631694842106316948421063 16
1/47	0.0309236A882061647154410309236A882061647154410309236A882061647154410309
1/48	0.03000000000000000000000000000000000000000000000000000000000000000000000000
1/49	0.02B322547A05A644A9380B9086741B615771283B02B322547A05A644A9380B9086741B
1/50	0.02A68781B05915343A0B62A68781B05915343A0B62A68781B05915343A0B62A68781B0

FRACTIONS 1/x IN BASE 13

```
1/1     0.CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
1/2     0.666666666666666666666666666666666666666666666666666666666666666666666
1/3     0.444444444444444444444444444444444444444444444444444444444444444444444
1/4     0.333333333333333333333333333333333333333333333333333333333333333333333
1/5     0.27A527A527A527A527A527A527A527A527A527A527A527A527A527A527A527A527
1/6     0.222222222222222222222222222222222222222222222222222222222222222222222
1/7     0.1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B1B
1/8     0.181818181818181818181818181818181818181818181818181818181818181818181818
1/9     0.15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A15A1
1/10    0.13B913B913B913B913B913B913B913B913B913B913B913B913B913B913B913B913B913
1/11    0.12495BA83712495BA83712495BA83712495BA83712495BA83712495BA83712495BA837
1/12    0.1111111111111111111111111111111111111111111111111111111111111111111111
1/13    0.1000000000000000000000000000000000000000000000000000000000000000000000
1/14    0.0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B0B
1/15    0.0B360B360B360B360B360B360B360B360B360B360B360B360B360B360B360B360B360B
1/16    0.0A740A740A740A740A740A740A740A740A740A740A740A740A740A740A740A740A740A
1/17    0.09C309C309C309C309C309C309C309C309C309C309C309C309C309C309C309C309C309
1/18    0.095095095095095095095095095095095095095095095095095095095095095095095
1/19    0.08B82976AC414A356208B82976AC414A356208B82976AC414A356208B82976AC414A35
1/20    0.085110851108511085110851108511085110851108511085110851108511085110851
1/21    0.080808080808080808080808080808080808080808080808080808080808080808080808
1/22    0.078B2C541A078B2C541A078B2C541A078B2C541A078B2C541A078B2C541A078B2C541A
1/23    0.074610235119074610235119074610235119074610235119074610235119074610235
1/24    0.070707070707070707070707070707070707070707070707070707070707070707070
1/25    0.069B5948ABC631738421069B5948ABC631738421069B5948ABC631738421069B5948AB
1/26    0.066666666666666666666666666666666666666666666666666666666666666666666666
1/27    0.0634A791C0634A791C0634A791C0634A791C0634A791C0634A791C0634A791C0634A79
1/28    0.060606060606060606060606060606060606060606060606060606060606060606060
1/29    0.05A9B28C7231A405A9B28C7231A405A9B28C7231A405A9B28C7231A405A9B28C7231A4
1/30    0.058305830583058305830583058305830583058305830583058305830583058305830
1/31    0.055B42692C21347C7718A631A0AB985055B42692C21347C7718A631A0AB985055B4269
1/32    0.05386BA205386BA205386BA205386BA205386BA205386BA205386BA205386BA205386B
1/33    0.051763C29B051763C29B051763C29B051763C29B051763C29B051763C29B051763C29B
1/34    0.04C804C804C804C804C804C804C804C804C804C804C804C804C804C804C804C804C804
1/35    0.04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04AA04
1/36    0.049049049049049049049049049049049049049049049049049049049049049049049
1/37    0.0474BC3B3215368A25C85810919AB79642A70474BC3B3215368A25C85810919AB79642
1/38    0.045A7B39BC87251931045A7B39BC87251931045A7B39BC87251931045A7B39BC872519
1/39    0.044444444444444444444444444444444444444444444444444444444444444444444
1/40    0.042C042C042C042C042C042C042C042C042C042C042C042C042C042C042C042C042C04
1/41    0.04177C08322B13645926C8B550C49AA1B96873A604177C08322B13645926C8B550C49A
1/42    0.040404040404040404040404040404040404040404040404040404040404040404040
1/43    0.03C1294AB646C51A7734303C1294AB646C51A7734303C1294AB646C51A7734303C1294
1/44    0.03AC16287503AC16287503AC16287503AC16287503AC16287503AC16287503AC162875
1/45    0.039A8C564812039A8C564812039A8C564812039A8C564812039A8C564812039A8C5648
1/46    0.038B78270B038B78270B038B78270B038B78270B038B78270B038B78270B038B78270B
1/47    0.03798B0AA30726491876114C95341C229C5A683B456BB803798B0AA30726491876114C
1/48    0.036A036A036A036A036A036A036A036A036A036A036A036A036A036A036A036A036A03
1/49    0.035AB53C972179035AB53C972179035AB53C972179035AB53C972179035AB53C972179
1/50    0.034C2B2455C980A1A877034C2B2455C980A1A877034C2B2455C980A1A877034C2B2455
```

FRACTIONS 1/x IN BASE 14

```
1/1     0.DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
1/2     0.777777777777777777777777777777777777777777777777777777777777777777777
1/3     0.494949494949494949494949494949494949494949494949494949494949494949494
1/4     0.373737373737373737373737373737373737373737373737373737373737373737373
```

1/5 0.2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B2B
1/6 0.249494949494949494949494949494949494949494949494949494949494949494
1/7 0.200000000000000000000000000000000000000000000000000000000000000000
1/8 0.1A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71A71
1/9 0.17AC6317AC6317AC6317AC6317AC6317AC6317AC6317AC6317AC6317AC6317AC6317AC
1/10 0.158585858585858585858585858585858585858585858585858585858585858585
1/11 0.13B6513B6513B6513B6513B6513B6513B6513B6513B6513B6513B6513B6513B65
1/12 0.124949494949494949494949494949494949494949494949494949494949494949
1/13 0.111111111111111111111111111111111111111111111111111111111111111111
1/14 0.100000000000000000000000000000000000000000000000000000000000000000
1/15 0.0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D0D
1/16 0.0C3700000000000000000000000000000000000000000000000000000000000000
1/17 0.0B75A91C4D2683410B75A91C4D2683410B75A91C4D2683410B75A91C4D2683410B75A9
1/18 0.010126317 1012631710126317101263171012631710126317101263171012
6317101263171012631710126
1/19 0.01045127522133981681111 0104512752213397.99999999999999916811110104512
752213397.999999999999999168111101045127522133397.999999999999999168
1/20 0.09112 111.999999999999998111.999999999999998111.999999999999998111.
999999999999998111.999999999999998111.999999999999998111.999999999999998111.
999999999999998111.999999999999998111.999999999999998111.999999999999998111.
999999999999998111.999999999999998111.999999999999998111.999999999999998111.
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999999999999998111.999999999999998111.999999999999998111.999999999999998111.
999999999999998111.9999999999999998
1/21 0.094949494949494949494949494949494949494949494949494949494949494949
1/22 0.08121027 7.9999999999999991210277.9999999999999991210277.999999999999
991210277.9999999999999991210277.9999999999999991210277.9999999999999991210277.9
999999999999991210277.9999999999999991210277.9999999999999991210277.999999999999
9991210277.9999999999999991210277.9999999999999991210277.99999999999999912102
1/23 0.0874391117121013569104122613 0874390.99999999999999999117121013569104 12
26130874390.9999999999999999911712101356910412261308 74
1/24 0.082494949494949494949494949494949494949494949494949494949494949494
1/25 0.0711108136235 07111081362350711108136235071110813623507111081362350711
10813623507111081362 35
1/26 0.077777777777777777777777777777777777777777777777777777777777777777
1/27 0.0738115911121361052842 1 07381159111213610528421073811591112136105284 21
07381159111213610 5284
1/28 0.070000000000000000000000000000000000000000000000000000000000000000
1/29 0.06108992511163120137354411821271011 3 06108992511163120137354411821271 0
1130610899251116312 0
1/30 0.067676767676767676767676767676767676767676767676767676767676767676
1/31 0.0647323881114012 9 06473237.99999999999999998111401290647323 7.9999999999
99999811140129064732 37.99999999999999981114012906473237.999999999999999981
1/32 0.061107000000000000000000000000000000000000000000000000000000000000
0
1/33 0.0513219108611 0513219108611051321910861105132191086110513219108611 0513
2191086110513219108611
1/34 0.0510912413268341011 7 510912413267.99999999999999993 3.99999999999999996 0.
9999999999999999999011751091241326 7.99999999999999993 3.99999999999999996 0.9999999999
999999901175109124132 67.99999999999999993 3.99999999999999996 0.99999999999999999901 1
75109124
1/35 0.058585858585858585858585858585858585858585858585858585858585858585
1/36 0.0563171012 631710126317101263171012631710126317101263171012631
71012631710126317101263
1/37 0.0542310138911103 0 542310138911103054231013891110305423101389111030542 3
101389111030542310138911
1/38 0.0522133981681111010451 27 52213397.999999999999999168111101045127522133
97.9999999999999991681111010451275 2213397.9999999999999999168111101 04

1/39 0.0505050505050505050505050505050505050505050505050505050505050505050505
1/40 0.04C858585858585858585858585858585858585858585858585858585858585858585858
1/41 0.04101213931 041012139310410121393104101213931041012139310410121393104101213931041
012139310410121393104101213 9
1/42 0.0494949494949494949494949494949494949494949494949494949494949494949494
1/43 0.0471157611101433811341252 13 047115761110143380.99999999999999991341252
13047115761110143380.99999999999999991341252130471157 6
1/44 0.04651311 65131165131165131165131165131165131165131165131165131165131165131 16
51311651311651
1/45 0.0441399 03.99999999999999964139903.99999999999999964139903.99999999999
999964139903.99999999999999964139903.99999999999999964139903.9999999999999996413
9903.99999999999999964139903.99999999999999964139903.99999999999999964139903.999
99999999999964139903.9999999999999996413
1/46 0.0439111712101356910412261308 7 4390.99999999999999991171210135691041226
130874390.99999999999999991171210135691041226130874 39
1/47 0.0425501272129763808410101 11 04255012721297637.99999999999999908410100.
99999999999999991104255012721297637.99999999999999908410100.9999999999999999110
1/48 0.0412494949494949494949494949494949494949494949494949494949494949494949494949
1/49 0.0400000000000000000000000000000000000000000000000000000000000000000000
1/50 0.0312124610117 31212461010.99999999999999997312124610 10.99999999999999
999731212461010.99999999999999997312124610 10.99999999999999997312124610 10.9999
99999999999997312124610 10.99999999999999999

FRACTIONS 1/x IN BASE 15

1/ 0.EEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEEE
1/ 0.7777777777777777777777777777777777777777777777777777777777777777777777777
1/ 0.5000000000000000000000000000000000000000000000000000000000000000000000000
1/ 0.3113113113113113113113113113113113113113113113113113113113113113113113113
113113113113113113113113113113113 11
1/ 0.3000000000000000000000000000000000000000000000000000000000000000000000000
1/ 0.2777777777777777777777777777777777777777777777777777777777777777777777777
1/ 0.2222222222222222222222222222222222222222222222222222222222222222222222222
1/ 0.1131131131131131131131131131131131131131131131131131131131131131131131131
131131131131131131131131131131131 13
1/ 0.B0000000000000000000000000000000000000000000000000000000000000000000000000
1/ 0.1777777777777777777777777777777777777777777777777777777777777777777777777
1/ 0.0.9999999999999999561240.9999999999999999561240.9999999999999999561240
.9999999999999999561240.9999999999999999561240.9999999999999999561240.9999999999
999999561240.9999999999999999561240.9999999999999999561240.9999999999999999561 24
0.9999999999999999561240.9999999999999999561240.9999999999999999561240.999999999
999999956124
1/ 0.1311311311311311311311311311311311311311311311311311311311311311311311311
311311311311311311311311311311311 3
1/ 0.0.99999999999999991.99999999999999983.99999999999999969361312105 1180.9
9999999999999991.99999999999999983.99999999999999969361312105 1180.99999999999999
991.99999999999999983.99999999999999969361312105 1180.99999999999999991.999999999
99999983.99999999999999969361312105 1180.99999999999999991.99999999999999983.9999
99999999999969361312105 1180.99999999999999991.99999999999999983.99999999999999969
361312105
1/ 0.1111111111111111111111111111111111111111111111111111111111111111111111111
1/ 0.1000000000000000000000000000000000000000000000000000000000000000000000000
1/ 0.0140140140140140140140140140140140140140140140140140140140140140140140140
140140140140140140140140140140140 14
1/ 0.0133714111701337141117013371411170133714111701337141117013371411170133
7141117013371411170133714 1
1/ 0.0C7777777777777777777777777777777777777777777777777777777777777777777777777
1/ 0.0111297181031431.9999999999999998571363.9999999999999996110111297181031431.9999999999999998571363.9999999999999996110111297181031431.99999999999999985

71363.999999999999999611011297181031431.99999999999999857136
1/ 0.011311311311

1/ 0.047.99999999999999132611047.99999999999999132611047.9999999999999991
32611047.99999999999999132611047.99999999999999132611047.99999999999999132611
047.99999999999999132611047.99999999999999132611047.99999999999999132611047.9
99999999999999132611
1/ 0.04777777777777777777777777777777777777777777777777777777777777777777

FRACTIONS 1/x IN BASE 16

1/ 0.FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
1/ 0.80000000000000000000000000000000000000000000000000000000000000000000
1/ 0.55555555555555555555555555555555555555555555555555555555555555555555
1/ 0.40000000000000000000000000000000000000000000000000000000000000000000
1/ 0.33333333333333333333333333333333333333333333333333333333333333333333
1/ 0.2AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
1/ 0.24924924924924924924924924924924924924924924924924924924924924924924
1/ 0.20000000000000000000000000000000000000000000000000000000000000000000
1/ 0.0.99999999999999991270.99999999999999991270.99999999999999991270.99999
999999999991270.99999999999999991270.99999999999999991270.99999999999999991270.9
9999999999999991270.99999999999999991270.99999999999999991270.99999999999999912
70.99999999999999991270.99999999999999991270.99999999999999991270.99999999999999
991270.99999999999999991270.99999999999999991270.99999999999999991270.9999999999
9999991270.99999999999999991270.99999999999999991270.99999999999999991270.999999
99999999991270.9999999999999999
1/ 0.19999999999999999999999999999999999999999999999999999999999999999999
1/ 0.173.99999999999999996513173.99999999999999996513173.99999999999999965131
73.99999999999999996513173.99999999999999996513173.99999999999999996513173.99999999
99999996513173.99999999999999996513173.99999999999999996513173.99999999999999996513
173.99999999999999996513173.99999999999999996513173.99999999999999996513173.9999999
999999996513
1/ 0.15555555555555555555555555555555555555555555555555555555555555555555
1/ 0.D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D11D111
1/ 0.12492492492492492492492492492492492492492492492492492492492492492492
1/ 0.11111111111111111111111111111111111111111111111111111111111111111111
1/ 0.10000000000000000000000000000000000000000000000000000000000000000000
1/ 0.01501501501501501501501501501501501501501501501501501501501501501501
501501501501501501501501501501501501501501501501501501501501501501501501
1/ 0.01438143814381438143814381438143814381438143814381438143814381438143814381
438143814381438143814381438
1/ 0.01379435145013794351450137943514501379435145013794351450137943514501379435
1/ 0.0CCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCCC
1/ 0.01230123012301230123012301230123012301230123012301230123012301230123012301
230123012301230123012301230
1/ 0.011102147.99999999999999911102147.99999999999999911102147.999999999999
99911102147.99999999999999911102147.99999999999999911102147.99999999999999911102
147.99999999999999911102147.99999999999999911102147.99999999999999911102147.9999
9999999999911102147.99999999999999911102147.99999999999999911102147.999999999999
9991110214
1/ 0.01121642128590112164212859011216421285901121642128590112164212859011216421285901121
6421285901121
1/ 0.0AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
1/ 0.01031370103137010313701031370103137010313701031370103137010313701031370103137
010313701031370103137010313 7
1/ 0.09138913891389138913891389138913891389138913891389138913891389138913891389
138913891389138913891389138
1/ 0.09711425141309711425141309711425141309711425141309711425141309711425141309711425141309711425
1/ 0.09249249249249249249249249249249249249249249249249249249249249249249249

1/ 0.08133131211081331312110813313121108133131211081331312110813
31312110813313121108133131211081331312110813313121108133131211
1/ 0.08888888888888888888888888888888888888888888888888888888888888888888
1/ 0.08421084210842108421084210842108421084210842108421084210842108421
1/ 0.08000000000000000000000000000000000000000000000000000000000000000000
1/ 0.07121150712115071211507121150712115071211507121150712115071211507121150712115
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1/ 0.07878787878787878787878787878787878787878787878787878787878787878787
1/ 0.07507507507507507507507507507507507507507507507507507507507507507507
1/ 0.070.999999999999999991270.999999999999999991270.999999999999999991270.999
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.999999999999999991270.999999999999999991270.999999999999999991270.999999999999999999
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999999991270.999999999999999991270.999999999999999991270.999999999999999991270.9999
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1/ 0.06141131445306141131445306141131445306141131445306141131445306141131445
53061411314453061411314
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0.999999999999999910152861112100.999999999999999910152861112100.999999999999999999
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1/ 0.069069069069069069069069069069069069069069069069069069069069069069069
1/ 0.066666666666666666666666666666666666666666666666666666666666666666666666
1/ 0.063147063147063147063147063147063147063147063147063147063147063147063
47063147063147
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513173.999999999999996513173.999999999999996513173.999999999999996513173.9999
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6513173.999999999999996513173.999999999999996513173.999999999999999651317
1/ 0.05110511051105110511051105110511051105110511051105110511051105110511051105
11051105110511051105110
1/ 0.05901121642128590112164212859011216421285901121642128590112164212859011
121642128590
1/ 0.057261.999999999999999810144123.999999999999999961512987.9999999999999
99211930.999999999999999057261.999999999999999810144123.999999999999996151298
7.999999999999999211930.999999999999999057261.999999999999999810144123.9999999
9999999961512987.999999999999999211930.99999999999999990
1/ 0.05555555555555555555555555555555555555555555555555555555555555555555555
1/ 0.0539781.999999999999999891211120.999999999999999941451401072150539781.
999999999999999891211120.999999999999999941451401072150539781.999999999999999891
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9999991411850.999999999999999911411850.999999999999999911411850.999999999999999914
11850.99999999999999991411
1/ 0.