sinx2.c

```
/* Vizsgáljuk, hogy a (PI/2)^n/n! mikor csökken 10^(-k) alá. */

#define PI 3.141592654

double hatvany(double a,int n)
{
    double v=1;
    while (--n>=0)
     v*=a;
    return v;
}

double faktorialis(int n)
{
    double v=1;
    while (n>1)
     v*=n--;
    return v;
}

main()
{
    double a;
    int n;
    for (n=1;n<=25;++n)
     printf("(PI/2)^%d/%d!=%20.18f\n",
      n,n,hatvany(PI/2,n)/faktorialis(n));
}
```

---

sinx2.out

```
  (PI/2)^1/1!=1.570796327000000048
  (PI/2)^2/2!=1.233700550458345591
  (PI/2)^3/3!=0.645964097759282541
  (PI/2)^4/4!=0.253669508033537494
  (PI/2)^5/5!=0.079692626298195540
  (PI/2)^6/6!=0.020863480779698192
  (PI/2)^7/7!=0.004681754139597860
  (PI/2)^8/8!=0.000919260275799670
  (PI/2)^9/9!=0.000160441184975903
(PI/2)^10/10!=0.000025202042405968
(PI/2)^11/11!=0.000003598843240381
(PI/2)^12/12!=0.000000471087478620
(PI/2)^13/13!=0.000000056921729316
(PI/2)^14/14!=0.000000006386603095
(PI/2)^15/15!=0.000000000668803512
(PI/2)^16/16!=0.000000000065659631
(PI/2)^17/17!=0.000000000006066936
(PI/2)^18/18!=0.000000000000529440
(PI/2)^19/19!=0.000000000000043771
(PI/2)^20/20!=0.000000000000003438
(PI/2)^21/21!=0.000000000000000257
(PI/2)^22/22!=0.000000000000000018
(PI/2)^23/23!=0.000000000000000001
(PI/2)^24/24!=0.000000000000000000
```

faktorialis.m

```
function v = faktorialis(n)
v=1;
while (n>1)
    v=v*n;
    n=n-1;
    endwhile
endfunction
```

sinx.octave

```
for n=1:25
    printf("(PI/2)^%d/%d!=%20.18f\n",n,n,(pi/2)^n/faktorialis(n));
    endfor
```

expx.octave

```
for n=1:25
    printf("2.72/%d!=%20.18f\n",n,2.72/faktorialis(n));
    endfor
```

expx.octave.out

```
GNU Octave, version 2.0.16 (i386-suse-linux-gnu).
Copyright (C) 1996, 1997, 1998, 1999, 2000 John W. Eaton.
This is free software with ABSOLUTELY NO WARRANTY.
For details, type 'warranty'.

 2.72/1!=2.720000000000000195
 2.72/2!=1.360000000000000098
 2.72/3!=0.453333333333333366
 2.72/4!=0.113333333333333341
 2.72/5!=0.022666666666666668
 2.72/6!=0.003777777777777778
 2.72/7!=0.000539682539682540
 2.72/8!=0.000067460317460317
 2.72/9!=0.000007495590828924
2.72/10!=0.000000749559082892
2.72/11!=0.000000068141734808
2.72/12!=0.000000005678477901
2.72/13!=0.000000000436805992
2.72/14!=0.000000000031200428
2.72/15!=0.000000000002080029
2.72/16!=0.000000000000130002
2.72/17!=0.000000000000007647
2.72/18!=0.000000000000000425
2.72/19!=0.000000000000000022
2.72/20!=0.000000000000000001
2.72/21!=0.000000000000000000
2.72/22!=0.000000000000000000
2.72/23!=0.000000000000000000
2.72/24!=0.000000000000000000
2.72/25!=0.000000000000000000
```

expx-horner.octave

```
x=1;
n=maxN=20
expx=1+x/n;
expx_octave=exp(x);
for i=1:maxN-1
    printf("n=%d T(n)=%20.18f\n",n,expx);
    n=maxN-i;
    expx=1+x/n*expx;
    endfor
printf("T(n)=%20.18f\n",expx);
printf("Eltérés: %20.18f\n",expx_octave-expx);
```

expx-horner.octave.out

```
n = 20
n=20 T(n)=1.050000000000000044
n=19 T(n)=1.055263157894736903
n=18 T(n)=1.058625730994152025
n=17 T(n)=1.062272101823185322
n=16 T(n)=1.066392006363949152
n=15 T(n)=1.071092800424263247
n=14 T(n)=1.076506628601733073
n=13 T(n)=1.082808202200133296
n=12 T(n)=1.090234016850011090
n=11 T(n)=1.099112183350001049
n=10 T(n)=1.109911218335000171
n= 9 T(n)=1.123323468703888883
n= 8 T(n)=1.140415433587986138
n= 7 T(n)=1.162916490512569512
n= 6 T(n)=1.193819415085428215
n= 5 T(n)=1.238763883017085732
n= 4 T(n)=1.309690970754271433
n= 3 T(n)=1.436563656918090404
n= 2 T(n)=1.718281828459045091
     T(n)=2.718281828459045091
Eltérés:  0.000000000000000000
```

log2.octave

```
log2=0;
ej=-1;
for n=1:50
    ej=-1*ej;
    log2=log2+1/(ej*n);
    printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,log(2)-log2);
    endfor
```

log2.octave.out

```
Eltérés a(z) 1. lépésben:     -0.306852819440054714
Eltérés a(z) 2. lépésben:      0.193147180559945286
Eltérés a(z) 3. lépésben:     -0.140186152773387973
Eltérés a(z) 4. lépésben:      0.109813847226612027
Eltérés a(z) 5. lépésben:     -0.090186152773387929
Eltérés a(z) 6. lépésben:      0.076480513893278701
Eltérés a(z) 7. lépésben:     -0.066376628963864204
Eltérés a(z) 8. lépésben:      0.058623371036135796
Eltérés a(z) 9. lépésben:     -0.052487740074975364
Eltérés a(z) 10. lépésben:     0.047512259925024614
.................................................
Eltérés a(z) 40. lépésben:     0.012343798767251224
Eltérés a(z) 41. lépésben:    -0.012046445135187822
Eltérés a(z) 42. lépésben:     0.011763078674336014
Eltérés a(z) 43. lépésben:    -0.011492735279152400
Eltérés a(z) 44. lépésben:     0.011234537448120308
Eltérés a(z) 45. lépésben:    -0.010987684774101947
Eltérés a(z) 46. lépésben:     0.010751445660680647
Eltérés a(z) 47. lépésben:    -0.010525150084000234
Eltérés a(z) 48. lépésben:     0.010308183249333136
Eltérés a(z) 49. lépésben:    -0.010099980015973009
Eltérés a(z) 50. lépésben:     0.009900019984027009
```

---

log2b.octave

```
log2=0;
ej=-1;
log10n=0;
for n=1:100000
    ej=-1*ej;
    log2=log2+1/(ej*n);
    if (10*log10n<=n)
        printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,log(2)-log2);
     log10n=n;
     endif
    endfor
```

---

log2b.octave.out

```
Eltérés a(z) 100. lépésben:    0.00497500124975025 5
Eltérés a(z) 1000. lépésben:   0.00049975000012303 4
Eltérés a(z) 10000. lépésben:  0.00004999749998679 8
Eltérés a(z) 100000. lépésben: 0.00000499997496417 0
```

4arctg1.octave

```
arctg1=0;
ej=-1;
for n=1:50
    ej=-1*ej;
    arctg1=arctg1+1/(ej*(2*n-1));
    printf("Eltérés a(z) %d. lépésben: %20.18f\n",n,pi-4*arctg1);
    endfor
```

4arctg1.octave.out

```
Eltérés a(z) 1. lépésben:     -0.858407346410206884
Eltérés a(z) 2. lépésben:      0.474925986923126153
Eltérés a(z) 3. lépésben:     -0.325074013076873669
Eltérés a(z) 4. lépésben:      0.246354558351697506
Eltérés a(z) 5. lépésben:     -0.198089886092747136
Eltérés a(z) 6. lépésben:      0.165546477543616621
Eltérés a(z) 7. lépésben:     -0.142145830148691310
Eltérés a(z) 8. lépésben:      0.124520836517975297
Eltérés a(z) 9. lépésben:     -0.110773281129083578
Eltérés a(z) 10. lépésben:     0.099753034660389872
.................................................
Eltérés a(z) 41. lépésben:    -0.024386619253422559
Eltérés a(z) 42. lépésben:     0.023806151830914946
Eltérés a(z) 43. lépésben:    -0.023252671698496652
Eltérés a(z) 44. lépésben:     0.022724339795756165
Eltérés a(z) 45. lépésben:    -0.022219480428963045
Eltérés a(z) 46. lépésben:     0.021736563527080754
Eltérés a(z) 47. lépésben:    -0.021274189161091250
Eltérés a(z) 48. lépésben:     0.020831073996803617
Eltérés a(z) 49. lépésben:    -0.020406039405258092
Eltérés a(z) 50. lépésben:     0.019998000998782128
```

4arctg1b.octave.out

```
Eltérés a(z) 100. lépésben:    0.009999750031239429
Eltérés a(z) 1000. lépésben:   0.000999999749998981
Eltérés a(z) 10000. lépésben:  0.000099999999758627
Eltérés a(z) 100000. lépésben: 0.000010000000073340
```

---

pi-szabnszog.bc

```
#!/usr/bin/bc -l
scale=99
pi=4*a(1)
r=1
x=1
n=6
m=sqrt(r*r-x*x/4);
i=1
while (i<120)
{
    print "i="; i
    print "n="; n
    print "m="; m
    print "x="; x
    print "PI-T="; pi-m*x*n/2
    x1=sqrt(x*x/4+(r-m)*(r-m))
    m1=sqrt(r*r-x1*x1/4)
    x=x1
    m=m1
    n=n*2
    i=i+1
    print "\n"
}
quit
```

pi-szabnszog.bc.out

```
i=1
n=6
m=.86602540378443864676372317075293618347140262690519031402790348972\
5966508454400018540573093378624287
x=1
PI-T=.54351644223647729817147387102069433378296151865953487889123412\
3129916880923008943006315545206244203

i=2
n=12
m=.96592582628906828674974319972889736763390483900840455040234307631\
0423213979855516347561741858070452
x=.51763809020504152469779767524809665669813780263986102762800641463\
0113949497603993844735949388499330
PI-T=.14159265358979323846264338327950288419716939937510582097494459\
2307816406286208998628034825342117070

i=3
n=24
m=.99144486137381041114455752692856287127773827444810227145877460352\
8922068405082531763265433453277397
x=.26105238444010318309681245579097802038748140962346450378123389667\
0265650459647259228480737984584243
PI-T=.03576411235954409027585733179092294400834258353593965520690610\
4527132709300585035559619129011121120

i=4
n=48
m=.99785892323860350673806979127277760453186639632596641807472562927\
4187850828698111037956547626966877
x=.13080625846028613363063111755035088288126460789010803566397530149\
2693814892777930572416034523039976
PI-T=.00896404030855504130089391378776663954739248389353177560013783\
2264628600770441887886265969527106256

i=5
n=96
m=.99946458747636564442983644624285994588364095315313089603368742859\
9674458291480489070820060615630369
x=.06543816564355228412731985263457625222992525450339239375619176751\
4637470426534785459604967089728326
PI-T=.00224245054292603132749656207108169504681881001251296503953735\
6483164848859538664890049996789158120

.....................................................................
```

i=82
n=14507109835375550096474112
m=.99999999999999999999999999999999999999999999999997655188413706465\
97085643691274822040717027473270 79
x=.00000000000000000000000043311075593141614142547559050134973103637\
39405689880199524288976646177101 92
PI-T=.000000000000000000000000000000000000000000000000001351700210183\
19302743077055278434022435268696076 24

i=83
n=29014219670751100192948224
m=.99999999999999999999999999999999999999999999999999413797103426616\
49271410922818705510179256868317 69
x=.00000000000000000000000021655537796570807071273779525067486551818\
69702844928555370943102969145771 49
PI-T=.000000000000000000000000000000000000000000000000007501625581429\
60031798667008088056298459504616009 68

i=84
n=58028439341502200385896448
m=.99999999999999999999999999999999999999999999999999853449275856654\
12317852730704676377544814217079 42
x=.00000000000000000000000010827768898285403535636889762533743275909\
34851422452733294270166130630106 27
PI-T=.000000000000000000000000000000000000000000000000009469932569209\
40968378482322286433590379736496467 92

i=85
n=11605687868300440077179289 6
m=.99999999999999999999999999999999999999999999999999963362318964163\
53079463182676169094386203554269 85
x=.00000000000000000000000005413884449142701767818444881266871637954\
67425711134011517524000233772817 37
PI-T=.000000000000000000000000000000000000000000000000062716870925582\
09780209954733893719854165766480457 68

.....

i=119
n=19938419936773738093557105904205168 64
m=.999999999999999999999999999999999999999999999999999999999999999999\
999999875866708206609792675247939 0
x=.00000000000000000000000000000000003151295502403926667651653336 94\
55859410723759776065640714937098 67
PI-T=.000000000000000000000000000152410290812056460572772512233582 98\
98188426331116210681863910210540269 52