

```

reset();
question2a:= proc(n)
begin ;
A:=matrix([[0,11,-5],[-2,17,-7],[-4,26,-10]]);
X:=matrix([[1],[1],[1]]);
for i from 1 to n do
Y:=A*X;
X:=Y/norm(Y,Infinity);
end_for;
return(norm(Y,Infinity));
end_proc;
question2a(30);

```

```
proc question2a(n) ... end
```

2684354558
671088639

```
S:=[question2a(k) $ k=1..30]:
```

```
A:=matrix([[0,11,-5],[-2,17,-7],[-4,26,-10]]);
```

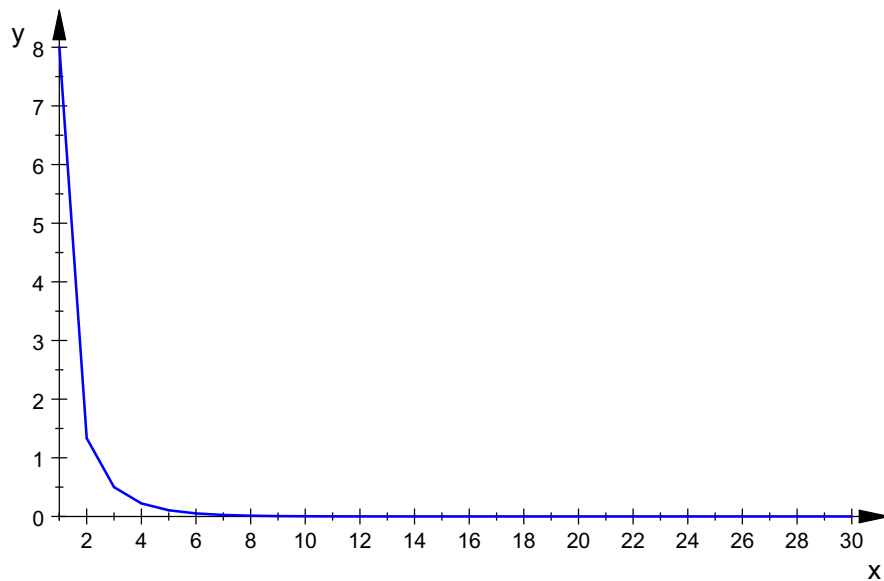
$$\begin{pmatrix} 0 & 11 & -5 \\ -2 & 17 & -7 \\ -4 & 26 & -10 \end{pmatrix}$$

```
true_value:=max(linalg::eigenvalues(A))
```

4

```
y:=abs(S-true_value):
```

```
plot(plot::Polygon2d([[z,y[z]] $ z=1..30]));
```



```
T:=matrix([[-20],[0],[20],[40],[60],[80],[100],[120]]);
```

$$\begin{pmatrix} -20 \\ 0 \\ 20 \\ 40 \\ 60 \\ 80 \\ 100 \\ 120 \end{pmatrix}$$

```
miu:=matrix([[4],[.38],[.095],[.032],[.015],[.0078],[.0045],[.0032]]);
```

$$\begin{pmatrix} 4 \\ 0.38 \\ 0.095 \\ 0.032 \\ 0.015 \\ 0.0078 \\ 0.0045 \\ 0.0032 \end{pmatrix}$$

```
a0_coeff:=matrix([[1] $ r=1..8]);
```

$$\begin{pmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \end{pmatrix}$$

```
a1_coeff:=T;
```

$$\begin{pmatrix} -20 \\ 0 \\ 20 \\ 40 \\ 60 \\ 80 \\ 100 \\ 120 \end{pmatrix}$$

```
a2_coeff:=map(T,x->x^2);
```

$$\begin{pmatrix} 400 \\ 0 \\ 400 \\ 1600 \\ 3600 \\ 6400 \\ 10000 \\ 14400 \end{pmatrix}$$

```
my_inverse:=linalg::pseudoInverse(a0_coeff.a1_coeff.a2_coeff);
```

$$\begin{pmatrix} \frac{3}{8} & \frac{47}{168} & \frac{11}{56} & \frac{1}{8} & \frac{11}{168} & \frac{1}{56} & -\frac{1}{56} & -\frac{1}{24} \\ -\frac{7}{480} & -\frac{1}{224} & \frac{3}{1120} & \frac{23}{3360} & \frac{9}{1120} & \frac{1}{160} & \frac{1}{672} & -\frac{1}{160} \\ \frac{1}{9600} & \frac{1}{67200} & -\frac{1}{22400} & -\frac{1}{13440} & -\frac{1}{13440} & -\frac{1}{22400} & \frac{1}{67200} & \frac{1}{9600} \end{pmatrix}$$

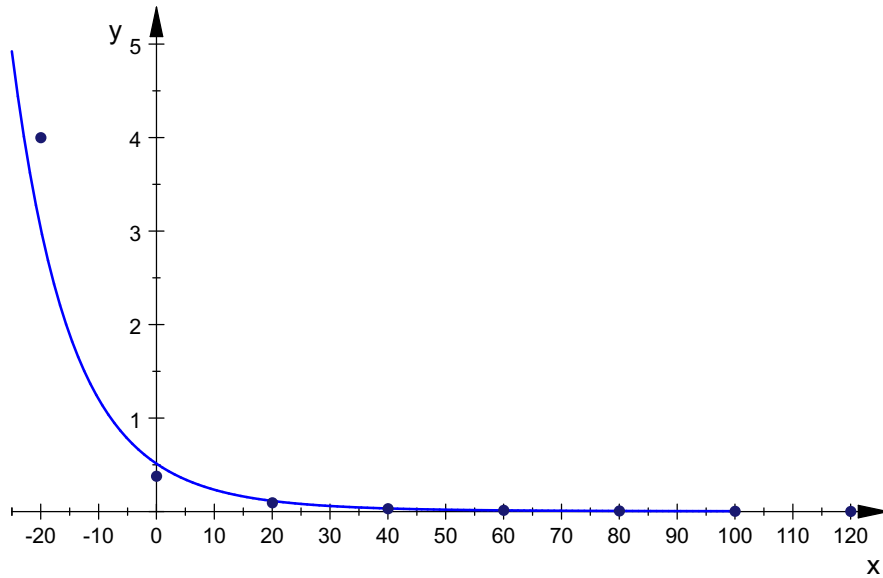
```
a:=my_inverse*map(miu,x->log(x));
```

$$\begin{pmatrix} \frac{3 \ln(4)}{8} - 1.189114455 \\ -\frac{7 \ln(4)}{480} - 0.06176713865 \\ \frac{\ln(4)}{9600} + 0.0001971377809 \end{pmatrix}$$

```
my_poly:=x->exp(a[1]+a[2]*x+a[3]*x^2);
```

$$x \rightarrow e^{a_1 + a_2 x + a_3 x^2}$$

```
plot(my_poly,x=-25..100,plot::PointList2d([[T[z],miu[z]] $ z=1..8]));
```



```
A:=Dom::Matrix()(10,10,(i,j)->(i-j)/(i+j+5));
```

$$\begin{pmatrix} 0 & -\frac{1}{8} & -\frac{2}{9} & -\frac{3}{10} & -\frac{4}{11} & -\frac{5}{12} & -\frac{6}{13} & -\frac{1}{2} & -\frac{8}{15} & -\frac{9}{16} \\ \frac{1}{8} & 0 & -\frac{1}{10} & -\frac{2}{11} & -\frac{1}{4} & -\frac{4}{13} & -\frac{5}{14} & -\frac{2}{5} & -\frac{7}{16} & -\frac{8}{17} \\ \frac{2}{9} & \frac{1}{10} & 0 & -\frac{1}{12} & -\frac{2}{13} & -\frac{3}{14} & -\frac{4}{15} & -\frac{5}{16} & -\frac{6}{17} & -\frac{7}{18} \\ \frac{3}{10} & \frac{2}{11} & \frac{1}{12} & 0 & -\frac{1}{14} & -\frac{2}{15} & -\frac{3}{16} & -\frac{4}{17} & -\frac{5}{18} & -\frac{6}{19} \\ \frac{4}{11} & \frac{1}{4} & \frac{2}{13} & \frac{1}{14} & 0 & -\frac{1}{16} & -\frac{2}{17} & -\frac{1}{6} & -\frac{4}{19} & -\frac{1}{4} \\ \frac{5}{12} & \frac{4}{13} & \frac{3}{14} & \frac{2}{15} & \frac{1}{16} & 0 & -\frac{1}{18} & -\frac{2}{19} & -\frac{3}{20} & -\frac{4}{21} \\ \frac{6}{13} & \frac{5}{14} & \frac{4}{15} & \frac{3}{16} & \frac{2}{17} & \frac{1}{18} & 0 & -\frac{1}{20} & -\frac{2}{21} & -\frac{3}{22} \\ \frac{1}{2} & \frac{2}{5} & \frac{5}{16} & \frac{4}{17} & \frac{1}{6} & \frac{2}{19} & \frac{1}{20} & 0 & -\frac{1}{22} & -\frac{2}{23} \\ \frac{8}{15} & \frac{7}{16} & \frac{6}{17} & \frac{5}{18} & \frac{4}{19} & \frac{3}{20} & \frac{2}{21} & \frac{1}{22} & 0 & -\frac{1}{24} \\ \frac{9}{16} & \frac{8}{17} & \frac{7}{18} & \frac{6}{19} & \frac{1}{4} & \frac{4}{21} & \frac{3}{22} & \frac{2}{23} & \frac{1}{24} & 0 \end{pmatrix}$$

```
linalg::tr(A*A)
```

$$-\frac{20087896967125835801}{2866776689942605440}$$

