In [1]:
```
A=matrix([[1/4,2,1/5],[0,1/2,2],[0,0,1/2]])
show(A)
```

Out[1]:

$$\begin{pmatrix} \frac{1}{4} & 2 & \frac{1}{5} \\ 0 & \frac{1}{2} & 2 \\ 0 & 0 & \frac{1}{2} \end{pmatrix}$$

In [2]:
```
show(A^8)
```

Out[2]:

$$\begin{pmatrix} \frac{1}{65536} & \frac{255}{8192} & \frac{12355}{16384} \\ 0 & \frac{1}{256} & \frac{1}{8} \\ 0 & 0 & \frac{1}{256} \end{pmatrix}$$

In [3]:
```
show(identity_matrix(3)-A^8)
```

Out[3]:

$$\begin{pmatrix} \frac{65535}{65536} & -\frac{255}{8192} & -\frac{12355}{16384} \\ 0 & \frac{255}{256} & -\frac{1}{8} \\ 0 & 0 & \frac{255}{256} \end{pmatrix}$$

In [4]:
```
show((identity_matrix(3)-A)^(-1)*(identity_matrix(3)-A^8))
```

Out[4]:

$$\begin{pmatrix} \frac{21845}{16384} & \frac{10795}{2048} & \frac{82367}{4096} \\ 0 & \frac{255}{128} & \frac{247}{32} \\ 0 & 0 & \frac{255}{128} \end{pmatrix}$$

In [5]:
```
show(identity_matrix(3)+A+A^2+A^3+A^4+A^5+A^6+A^7)
```

Out[5]:

$$\begin{pmatrix} \frac{21845}{16384} & \frac{10795}{2048} & \frac{82367}{4096} \\ 0 & \frac{255}{128} & \frac{247}{32} \\ 0 & 0 & \frac{255}{128} \end{pmatrix}$$

In [6]:
```
show(A.characteristic_polynomial())
```

Out[6]:

$$x^3 - \frac{5}{4}x^2 + \frac{1}{2}x - \frac{1}{16}$$

In [7]:
```
show(A.characteristic_polynomial().factor())
```

Out[7]:

$$(x - \frac{1}{4}) \cdot (x - \frac{1}{2})^2$$

In [8]:

```
show((identity_matrix(3)-A)^(-1))
```

Out[8]:

$$\begin{pmatrix} \frac{4}{3} & \frac{16}{3} & \frac{328}{15} \\ 0 & 2 & 8 \\ 0 & 0 & 2 \end{pmatrix}$$

In [0]: