

In [1]:

```
f(x)=e^x  
show(f)
```

Out[1]:

$x \mapsto e^x$

In [2]:

```
for k in srange(6):  
    fdash(x)=derivative(f(x),x,k)  
    show(fdash(0)*x^k/factorial(k))
```

Out[2]:

1

Out[2]:

x

Out[2]:

$\frac{1}{2}x^2$

Out[2]:

$\frac{1}{6}x^3$

Out[2]:

$\frac{1}{24}x^4$

Out[2]:

$\frac{1}{120}x^5$

In [3]:

```
show(taylor(f(x),x,0,5))
```

Out[3]:

$\frac{1}{120}x^5 + \frac{1}{24}x^4 + \frac{1}{6}x^3 + \frac{1}{2}x^2 + x + 1$

In [4]:

```
f(x)=cos(x)  
show(f)
```

Out[4]:

$x \mapsto \cos(x)$

In [5]:

```
for k in xrange(10):  
    fdash(x)=derivative(f(x),x,k)  
    show(fdash(0)*x^k/factorial(k))
```

Out[5]:

1

Out[5]:

0

Out[5]:

$$-\frac{1}{2}x^2$$

Out[5]:

0

Out[5]:

$$\frac{1}{24}x^4$$

Out[5]:

0

Out[5]:

$$-\frac{1}{720}x^6$$

Out[5]:

0

Out[5]:

$$\frac{1}{40320}x^8$$

Out[5]:

0

In [6]:

```
show(taylor(f(x),x,0,9))
```

Out[6]:

$$\frac{1}{40320}x^8 - \frac{1}{720}x^6 + \frac{1}{24}x^4 - \frac{1}{2}x^2 + 1$$

In [7]:

```
f(x)=sin(x)
show(f)
```

Out[7]:

$x \mapsto \sin(x)$

In [8]:

```
for k in xrange(10):
    fdash(x)=derivative(f(x),x,k)
    show(fdash(0)*x^k/factorial(k))
```

Out[8]:

0

Out[8]:

$x$

Out[8]:

0

Out[8]:

$-\frac{1}{6}x^3$

Out[8]:

0

Out[8]:

$\frac{1}{120}x^5$

Out[8]:

0

Out[8]:

$-\frac{1}{5040}x^7$

Out[8]:

0

Out[8]:

$\frac{1}{362880}x^9$

In [9]:

```
show(taylor(f(x),x,0,9))
```

Out[9]:

$$\frac{1}{362880} x^9 - \frac{1}{5040} x^7 + \frac{1}{120} x^5 - \frac{1}{6} x^3 + x$$

In [10]:

```
f(x)=1/(1-x)  
show(f)
```

Out[10]:

$$x \mapsto -\frac{1}{x-1}$$

In [11]:

```
for k in xrange(5):  
    fdash(x)=derivative(f(x),x,k)  
    show(fdash(0)*x^k/factorial(k))
```

Out[11]:

1

Out[11]:

x

Out[11]:

$x^2$

Out[11]:

$x^3$

Out[11]:

$x^4$

In [12]:

```
show(taylor(f(x),x,0,5))
```

Out[12]:

$$x^5 + x^4 + x^3 + x^2 + x + 1$$

In [13]:

```
f(x)=1/(1+x)  
show(f)
```

Out[13]:

$$x \mapsto \frac{1}{x+1}$$

In [14]:

```
for k in xrange(5):
    fdash(x)=derivative(f(x),x,k)
    show(fdash(0)*x^k/factorial(k))
```

Out[14]:

1

Out[14]:

$-x$

Out[14]:

$x^2$

Out[14]:

$-x^3$

Out[14]:

$x^4$

In [15]:

```
show(taylor(f(x),x,0,5))
```

Out[15]:

$-x^5 + x^4 - x^3 + x^2 - x + 1$

In [16]:

```
f(x)=ln(1+x)
show(f)
```

Out[16]:

$x \mapsto \log(x + 1)$

In [17]:

```
for k in srange(5):
    fdash(x)=derivative(f(x),x,k)
    show(fdash(0)*x^k/factorial(k))
```

Out[17]:

0

Out[17]:

x

Out[17]:

$$-\frac{1}{2}x^2$$

Out[17]:

$$\frac{1}{3}x^3$$

Out[17]:

$$-\frac{1}{4}x^4$$

In [18]:

```
show(taylor(f(x),x,0,5))
```

Out[18]:

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

In [19]:

```
f(x)=arctan(x)
show(f)
```

Out[19]:

$x \mapsto \arctan(x)$

In [20]:

```
for k in xrange(8):  
    fdash(x)=derivative(f(x),x,k)  
    show(fdash(0)*x^k/factorial(k))
```

Out[20]:

0

Out[20]:

x

Out[20]:

0

Out[20]:

$$-\frac{1}{3}x^3$$

Out[20]:

0

Out[20]:

$$\frac{1}{5}x^5$$

Out[20]:

0

Out[20]:

$$-\frac{1}{7}x^7$$

In [21]:

```
show(taylor(f(x),x,0,7))
```

Out[21]:

$$-\frac{1}{7}x^7 + \frac{1}{5}x^5 - \frac{1}{3}x^3 + x$$

In [0]: