

lektion1

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1 Lektion 1

1.1 Einfache Arithmetik

[1] : $2*3$

[1] : 6

[2] : $1+2$

[2] : 3

[3] : $1+2*3$

[3] : 7

[4] : $2*(1+2)$

[4] : 6

[5] : $2**3$

[5] : 8

[6] : $1/3$

[6]: 0.3333333333333333

[7]: `3*1/3`

[7]: 1.0

[8]: `(1/3)**3-1/3**3`

[8]: -6.938893903907228e-18

[11]: `(1/3)**100 * 3**100`

[11]: 0.9999999999999994

[10]: `0.000001 - 1e-6`

[10]: 0.0

1.2 Variablen

Zuweisungsoperator =

[12]: `a = 3`

[13]: `a`

[13]: 3

[14]: `b`

```
-----  
NameError                                Traceback (most recent call last)  
<ipython-input-14-89e6c98d9288> in <module>  
----> 1 b  
  
NameError: name 'b' is not defined
```

[15]: `b = a`

[16]: `b`

[16]: 3

[17]: `a`

[17]: 3

```
[18]: b
```

```
[18]: 3
```

1.3 Symbolische Arithmetik

```
[19]: from sympy import *  
      init_printing()
```

```
[19]: S(1)/3
```

```
[19]:  $\frac{1}{3}$ 
```

```
[20]: S(3)+3
```

```
[20]: 6
```

```
[21]: (S(3)+3)/9
```

```
[21]:  $\frac{2}{3}$ 
```

```
[22]: Rational(1,3)
```

```
[22]:  $\frac{1}{3}$ 
```

```
[23]: Rational(1/2)
```

```
[23]:  $\frac{1}{2}$ 
```

```
[24]: Rational("1/2")
```

```
[24]:  $\frac{1}{2}$ 
```

```
[25]: (S(1)/3)**100 * 3**100
```

```
[25]: 1
```

1.4 Gleitkommazahlen mit vielen Nachkommastellen

```
[26]: drittel = Rational(1,3)
```

```
[20]: drittel**100 * 3**100
```

```
NameError
```

```
Traceback (most recent call last)
```

```
<ipython-input-20-84097635774b> in <module>
```


[38]: int

```
[39]: type(S(3))
```

[39]: sympy.core.numbers.Integer

```
[40]: type(S(1)/3)
```

[40]: sympy.core.numbers.Rational

1.6 Symbole

```
[41]: x = S('x')
```

```
[42]: type(x)
```

[42]: sympy.core.symbol.Symbol

```
[43]: y = S('y')
```

```
[44]: f = (x+y)**2
```

```
[45]: f
```

[45]: $(x + y)^2$

```
[46]: type(f)
```

[46]: sympy.core.power.Pow

```
[47]: x = 5
```

```
[48]: f
```

[48]: $(x + y)^2$

```
[49]: f.subs(x,5)
```

[49]: $(x + y)^2$

```
[50]: x = S('x')
```

```
[51]: f.subs(x,5)
```

[51]: $(y + 5)^2$

1.7 einfache Funktionen

```
[52]: sqrt(S(81))
```

```
[52]: 9
```

```
[53]: sqrt(S(2))
```

```
[53]:  $\sqrt{2}$ 
```

```
[54]: sqrt(-81)
```

```
[54]:  $9i$ 
```

```
[55]: sqrt(2.)
```

```
[55]: 1.4142135623731
```

```
[56]: sqrt(9*y**2)
```

```
[56]:  $3\sqrt{y^2}$ 
```

```
[58]: factorial(5)
```

```
[58]: 120
```

```
[59]: factorial(170)
```

```
[59]: 725741561530799896739672821112926311471699168129645137654357779890056184340170615785235074924261745
```

```
[60]: cos(pi)
```

```
[60]: -1
```

```
[61]: sin(pi)
```

```
[61]: 0
```

```
[62]: tan(pi/2)
```

```
[62]:  $\infty$ 
```

```
[63]: print(tan(pi/2))
```

zoo

```
[64]: ?zoo
```

```
[65]: alpha = S('alpha')
```

```
[66]: alpha
```

```
[66]:  $\alpha$ 
```

```
[67]: exp(1)
```

```
[67]: e
```

```
[68]: log(exp(1))
```

```
[68]: 1
```

```
[69]: abs(-1)
```

```
[69]: 1
```

```
[ ]:
```