

```
[54]: from sympy import *
from sympy.abc import x
import math
```

```
[58]: # x**5
u = x**5
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
5
x
w.r.t x is 5*x**4
```

```
[59]: # 10**x**2
u = 10**x**2
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
2
10*x
w.r.t x is 20*x
```

```
[60]: # 20*(x**4)+9
u = 20*(x**4)+9
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
20
9 + —
4
x
w.r.t x is -80/x**5
```

```
[61]: # log 10
u =math.log(10)
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
2.302585092994046
w.r.t x is 0
```

```
[62]: #sin(3*x+5)
u =sin(3*x+5)
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
sin(3*x + 5)
w.r.t x is 3*cos(3*x + 5)
```

```
[63]: #(tan(x))**2
u =(tan(x))**2
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
2
tan (x)
w.r.t x is (2*tan(x)**2 + 2)*tan(x)
```

```
[64]: #(sin(x))**2
u =(sin(x))**2
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
2
sin (x)
w.r.t x is 2*sin(x)*cos(x)
```

```
[65]: #e*tan(x)
u =(E)**(tan(x))
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
tan(x)
e
w.r.t x is (tan(x)**2 + 1)*exp(tan(x))
```

```
[66]: #(sin(2*x+1))**2
u =(sin(2*x+1))**2
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
2
sin (2*x + 1)
w.r.t x is 4*sin(2*x + 1)*cos(2*x + 1)
```

```
[67]: #((x+1)/(x-1))
u =(x+1)/(x-1)
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )

derivative of
x + 1
x - 1
w.r.t x is 1/(x - 1) - (x + 1)/(x - 1)**2
```

```
[68]: #((x+1)*(x+2))/x**2
y =(x+1)*(x+2)/x**2
result = diff(y,x)
print("derivative of")
pprint(y)
print("w.r.t x is",result.subs(x, 3) )

derivative of
(x + 2)·(x + 3)
2
x
w.r.t x is -1
```

```
[69]: #cos(tan(x))
u =cos(tan(x))
```

```
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )
```

```
derivative of
cos(tan(x))
w.r.t x is -(tan(x)**2 + 1)*sin(tan(x))
```

```
[70]: #x/(1+tan(x))
u =x/(1+tan(x))
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )
5
```

```
derivative of
x
tan(x) + 1
w.r.t x is x*(-tan(x)**2 - 1)/(tan(x) + 1)**2 + 1/(tan(x) + 1)
[70]: 5
```

```
[71]: #e**x * sin(x)
u =e**x * sin(x)
result = diff(u,x)
print("derivative of")
pprint(u)
print("w.r.t x is",result )
```

```
derivative of
x
e *sin(x)
w.r.t x is exp(x)*sin(x) + exp(x)*cos(x)
```