

```
[ > restart;
```

```
[ > diff(sin(a*x^b), x);
```

$$\frac{\cos(ax^b) a x^b b}{x}$$

```
[ > y:=arcsin(x);
```

$$y := \arcsin(x)$$

```
[ > diff(y, x);
```

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

```
[ > y:=arccos(c*x^2+1/2);
```

$$y := \arccos\left(cx^2 + \frac{1}{2}\right)$$

```
[ > diff(y, x);
```

$$-4 \frac{cx}{\sqrt{3-4c^2x^4-4cx^2}}$$

```
[ > diff(diff(y, x), x);
```

$$-4 \frac{c}{\sqrt{3-4c^2x^4-4cx^2}} + \frac{2cx(-16c^2x^3-8cx)}{(3-4c^2x^4-4cx^2)^{(3/2)}}$$

```
[ > diff(y, x, x);
```

$$-4 \frac{c}{\sqrt{3-4c^2x^4-4cx^2}} + \frac{2cx(-16c^2x^3-8cx)}{(3-4c^2x^4-4cx^2)^{(3/2)}}$$

```
[ > diff(y, x$2);
```

$$-4 \frac{c}{\sqrt{3-4c^2x^4-4cx^2}} + \frac{2cx(-16c^2x^3-8cx)}{(3-4c^2x^4-4cx^2)^{(3/2)}}$$

```
> diff(y, x$4);
```

$$\begin{aligned} & -9 \frac{c(-16c^2x^3 - 8cx)^2}{(3 - 4c^2x^4 - 4cx^2)^{(5/2)}} + \frac{6c(-48c^2x^2 - 8c)}{(3 - 4c^2x^4 - 4cx^2)^{(3/2)}} \\ & + \frac{\frac{15}{2}cx(-16c^2x^3 - 8cx)^3}{(3 - 4c^2x^4 - 4cx^2)^{(7/2)}} \\ & - \frac{9cx(-16c^2x^3 - 8cx)(-48c^2x^2 - 8c)}{(3 - 4c^2x^4 - 4cx^2)^{(5/2)}} \\ & - \frac{192c^3x^2}{(3 - 4c^2x^4 - 4cx^2)^{(3/2)}} \end{aligned}$$

```
> subs(x=0, %);
```

$$-\frac{16}{3}c^2\sqrt{3}$$

```
> f:=x->-log(1+x^2)-2*arctan(x+1)+x;
```

$$f := x \rightarrow -\log(1+x^2) - 2\arctan(x+1) + x$$

```
> diff(f(x), x);
```

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

```
> f1:=x->diff(f(x), x);
```

$$f1 := x \rightarrow \text{diff}(f(x), x)$$

```
> f1(x);
```

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

```
> f1(3);  
Error, (in f1) wrong number (or type) of parameters in  
function diff
```

```
> diff(sin(3),3);  
Error, wrong number (or type) of parameters in  
function diff
```

```
> y;
```

$$\arccos\left(cx^2 + \frac{1}{2}\right)$$

```
> g:=unapply(y,x);
```

$$g := x \rightarrow \arccos\left(cx^2 + \frac{1}{2}\right)$$

```
> g(x);
```

$$\arccos\left(cx^2 + \frac{1}{2}\right)$$

```
> g(t);
```

$$\arccos\left(ct^2 + \frac{1}{2}\right)$$

```
> g(7);
```

$$\arccos\left(49c + \frac{1}{2}\right)$$

```
> f1:=unapply(diff(f(x),x),x);
```

$$f1 := x \rightarrow -2 \frac{x}{1+x^2} - \frac{2}{1+(x+1)^2} + 1$$

```
> f1:=D(f);
```

$$f1 := x \rightarrow -2 \frac{x}{1+x^2} - \frac{2}{1+(x+1)^2} + 1$$

```
> f1(x);
```

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

```
> factor(f1(x));
```

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

```
> D(D(f))(0);
```

-1

```
> D(D(f))(2);
```

$\frac{9}{25}$

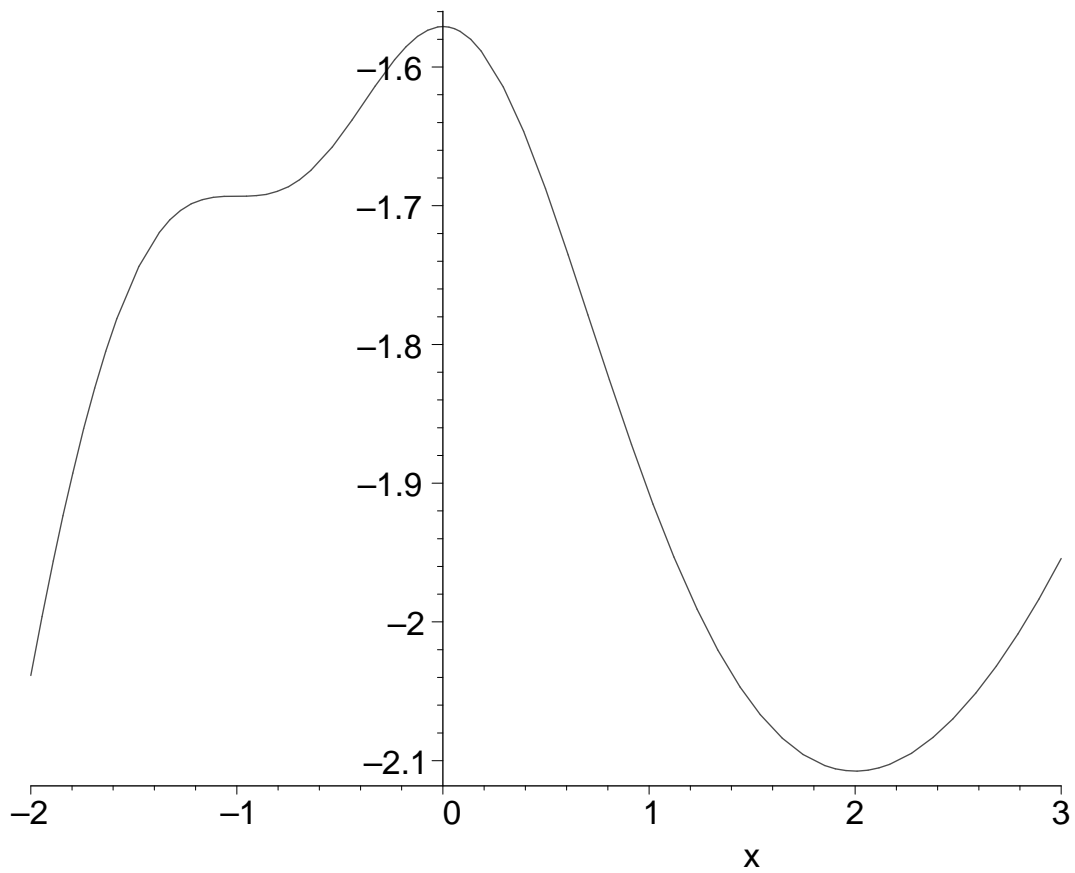
```
> D(D(f))(-1);
```

0

```
> D(D(D(f)))(-1);
```

3

```
> plot(f(x), x=-2..3);
```



```
> f(0);
```

$$-\frac{1}{2}\pi$$

```
> maximize(f(x), x=-2..3);
```

$$-\frac{1}{2}\pi$$

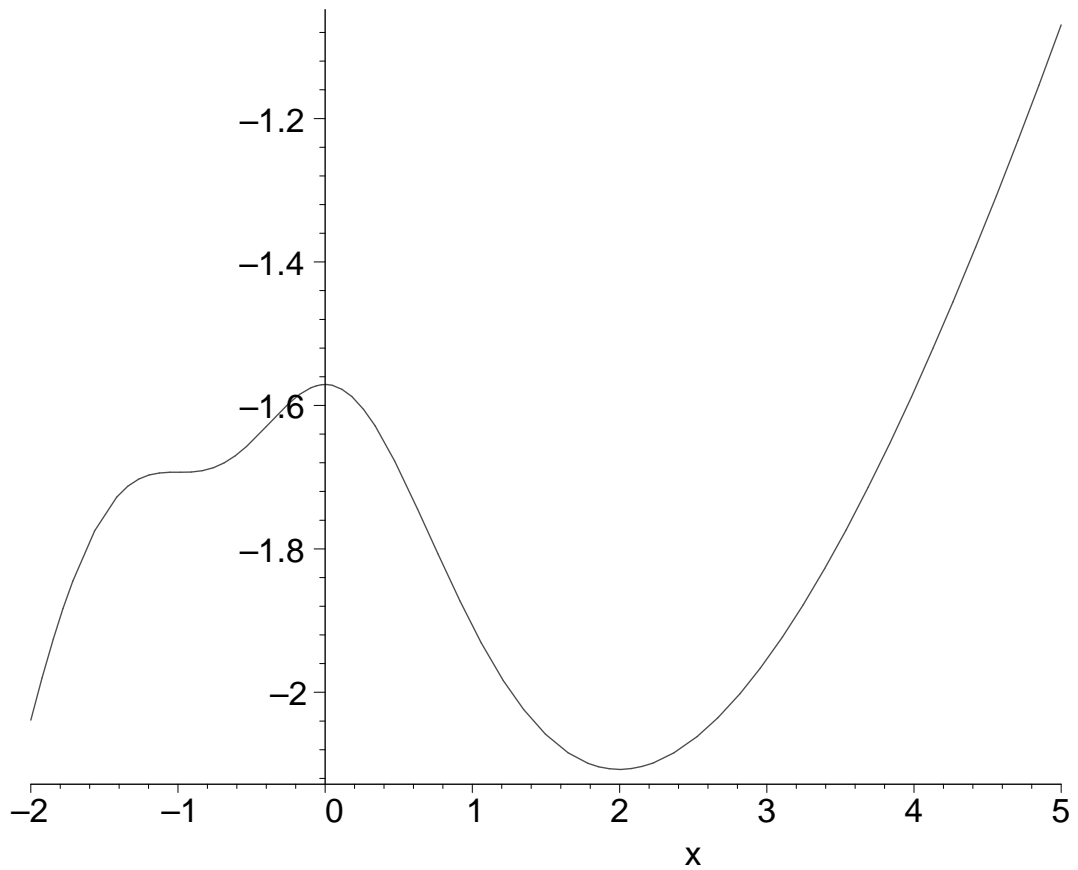
```
> maximize(f(x), x=-2..3, location=true);
```

$$-\frac{1}{2}\pi, \left\{ \left[ \{x=0\}, -\frac{1}{2}\pi \right] \right\}$$

```
> maximize(f(x), x=-2..5, location=true);
```

$$-\ln(26) - 2 \arctan(6) + 5, \left\{ \left[ \{x=5\}, -\ln(26) - 2 \arctan(6) + 5 \right] \right\}$$

```
> plot(f(x), x=-2..5);
```



```
> f := (sin@cos);
```

$f := \sin @ \cos$

```
> f(x);
```

$\sin(\cos(x))$

```
> f := x -> x^3;
```

$f := x \rightarrow x^3$

```
> (f@@4)(x);
```

$x^{81}$

```
> f(f(f(f(x))));
```

$x^{81}$

```
> f := x -> x*exp(x);
```



$$\int_0^{2\frac{\pi}{a}} 2 \frac{1}{5 - 3 \cos(ax)} dx$$

```
> int(2/(5-3*cos(a*x)),x=0..2*Pi/a);
```

```
> int(2/(5-3*cos(a*x)),x);
```

$$\frac{\arctan\left(2 \tan\left(\frac{1}{2} a x\right)\right)}{a}$$

```
> a:=1;
```

$a := 1$

```
> int(2/(5-3*cos(a*x)),x);
```

$$\arctan\left(2 \tan\left(\frac{1}{2} x\right)\right)$$

```
> int(2/(5-3*cos(a*x)),x=0..2*Pi/a);
```

$\pi$

```
> Int(2/(5-3*cos(a*x)),x=0..2*Pi/a);
```

$$\int_0^{2\pi} 2 \frac{1}{5 - 3 \cos(x)} dx$$

```
> restart;
```

```
> F:=(x,y)->x^5/y;
```

$$F := (x, y) \rightarrow \frac{x^5}{y}$$



```

[ > F(x,y) ;
      
$$\frac{x^5}{y}$$

[ > diff(F(x,y),x$3,y$4) ;
      
$$1440 \frac{x^2}{y^5}$$

[ > D[1$3,2$4](F) ;
      
$$(x,y) \rightarrow 1440 \frac{x^2}{y^5}$$

[ > D[1$3,2$4](F)(u,v) ;
      
$$1440 \frac{u^2}{v^5}$$

[ > # Kettenregel
[ > D(f@g) ;
      
$$((D(f))@g) D(g)$$

[ > (D@@3)(f@g) ;
      
$$(((D^{(3)})(f))@g) D(g)^3 + 3 (((D^{(2)})(f))@g) (D^{(2)})(g) D(g)$$

      
$$+ ((D(f))@g) (D^{(3)})(g)$$

[ >

```