

```
> Diff(exp(x^2), x):%=value(%)
```

$$\frac{d}{dx} e^{x^2} = 2x e^{x^2}$$

```
> Diff(exp(x^2), x$2):%=value(%)
```

$$\frac{d^2}{dx^2} e^{x^2} = 2e^{x^2} + 4x^2 e^{x^2}$$

```
> alias(y=y(x));
```

y

```
> eq:=x^2+y^2=c;
```

$$eq:=x^2+y^2=c$$

```
> dydx:=solve(diff(eq,x), diff(y,x));
```

$$dydx:=-\frac{x}{y}$$

```
> alias(y=y);
```

```
> Diff(exp(a*x*y^2), x,y$2): %=value(%)
```

$$\frac{\partial^3}{\partial y^2 \partial x} e^{axy^2} = 2ae^{axy^2} + 10a^2y^2xe^{axy^2} + 4a^3y^4x^2e^{axy^2}$$

```
> Integrate(x/(x^3+1),x): %=value(%)
```

$$\int \frac{x}{x^3+1} dx = -\frac{1}{3} \ln(x+1) + \frac{1}{6} \ln(x^2-x+1) + \frac{1}{3} \sqrt{3} \arctan\left(\frac{1}{3}(2x-1)\sqrt{3}\right)$$

```
> Integrate(x/(x^3+1),x=1..2): %=value(%)
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$$\int_1^2 \frac{x}{x^3+1} dx = \frac{1}{3} \ln(2) + \frac{1}{18} \sqrt{3} \pi - \frac{1}{6} \ln(3)$$

```
> Sum(k^7, k=1..20): %=value(%)
```

$$\sum_{k=1}^{20} k^7 = 3877286700$$

```
> t:=taylor(sin(tan(x))-tan(sin(x)), x=0, 13);
```

$$t := -\frac{1}{30} x^7 - \frac{29}{756} x^9 - \frac{1913}{75600} x^{11} + O(x^{13})$$

```
> Limit((x^2-1)/(2*x^2-x-1),x=1): %=value(%)
```

$$\lim_{x \rightarrow 1} \frac{x^2-1}{2x^2-x-1} = \frac{2}{3}$$

```
> Limit( cos(x)^(1/x^3), x=0, right): %=value(%)
```

$$\lim_{x \rightarrow 0^+} \cos(x)^{\frac{1}{x^3}} = 0$$

```
(%i1) 'diff(exp(x^2), x)$ %=ev(%, nouns);
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$$(\%02) \frac{d}{dx} e^{x^2} = 2x e^{x^2}$$

```
(%i3) 'diff(exp(x^2), x, 2)$ %=ev(%, nouns);
```

$$(\%04) \frac{d^2}{dx^2} e^{x^2} = 4x^2 e^{x^2} + 2e^{x^2}$$

```
(%i5) eq : x^2 + y^2 = c; depends(y, x);
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$$(\%05) y^2 + x^2 = c$$

$$(\%06) [y(x)]$$

```
(%i7) dydx:solve(diff(eq, x), 'diff(y, x));
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$$(\%07) \left[\frac{d}{dx} y = -\frac{x}{y} \right]$$

```
(%i8) remove(y, dependency);
```

$$(\%08) done$$

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(%i9) 'diff(exp(a*x*y^2), x, 1, y, 2)$ %=ev(%, nouns);
```

$$(\%10) \frac{d^3}{dx dy^2} e^{a x y^2} = 4 a^3 x^2 y^4 e^{a x y^2} + 10 a^2 x y^2 e^{a x y^2} + 2 a e^{a x y^2}$$

```
(%i11) 'integrate(x/(x^3+1), x)$ %=ev(%, nouns);
```

$$(\%12) \int \frac{x}{x^3+1} dx = \frac{\log(x^2 - x + 1)}{6} + \frac{\operatorname{atan}\left(\frac{2x-1}{\sqrt{3}}\right)}{\sqrt{3}} - \frac{\log(x+1)}{3}$$

```
(%i13) 'integrate(x/(x^3+1), x, 1, 2); %=ev(%, nouns);
```

$$(\%13) \int_1^2 \frac{x}{x^3+1} dx$$

$$(\%14) \int_1^2 \frac{x}{x^3+1} dx = -\frac{\log(3)}{6} + \frac{6 \log(2) - \sqrt{3} \pi}{18} + \frac{\pi}{3^{3/2}}$$

```
(%i15) 'sum(k^7, k, 1, 20)$ %=ev(%, nouns);
```

$$(\%16) \sum_{k=1}^{20} k^7 = 3877286700$$

```
(%i17) t : taylor(sin(tan(x))-tan(sin(x)),x,0,11);
```

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(%o17)/T/ 
$$-\frac{x^7}{30} - \frac{29x^9}{756} - \frac{1913x^{11}}{75600} + \dots$$

```

```
(%i18) 'limit((x^2-1)/(2*x^2-x-1),x,1)$ %=ev(% , nouns);
```

```
(%o19) 
$$\lim_{x \rightarrow 1} \frac{x^2 - 1}{2x^2 - x - 1} = \frac{2}{3}$$

```

```
(%i20) 'limit( cos(x)^(1/x^3), x,0, plus)$ %=ev(% , nouns);
```

```
(%o21) 
$$\lim_{x \rightarrow 0^+} \cos(x)^{\frac{1}{x^3}} = 0$$

```