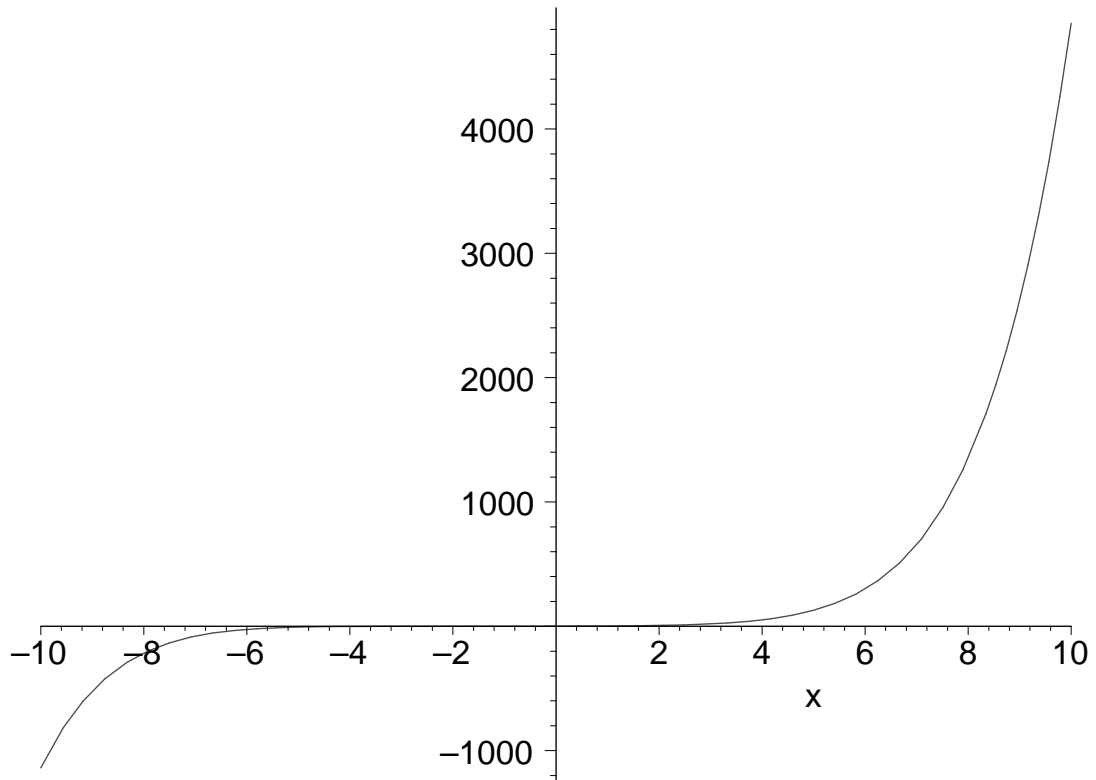


```

> restart;
> f:=exp(a*x)*cos(x-a);
                                f:=e(ax)cos(x-a)
> taylor(f,x=a,4);
e(a2)+e(a2)a(x-a)+ $\left(-\frac{1}{2}e^{(a^2)}+\frac{1}{2}e^{(a^2)}a^2\right)(x-a)^2+$ 
 $\left(-\frac{1}{2}e^{(a^2)}a+\frac{1}{6}e^{(a^2)}a^3\right)(x-a)^3+O((x-a)^4)$ 
> p:=taylor(exp(x),x=0,8);
p:=1+x+\frac{1}{2}x^2+\frac{1}{6}x^3+\frac{1}{24}x^4+\frac{1}{120}x^5+\frac{1}{720}x^6+\frac{1}{5040}x^7+O(x^8)
> plot(p,x);
Plotting error, empty plot
> p:=convert(taylor(exp(x),x=0,8),polynom);
p:=1+x+\frac{1}{2}x^2+\frac{1}{6}x^3+\frac{1}{24}x^4+\frac{1}{120}x^5+\frac{1}{720}x^6+\frac{1}{5040}x^7
> plot(p,x);

```



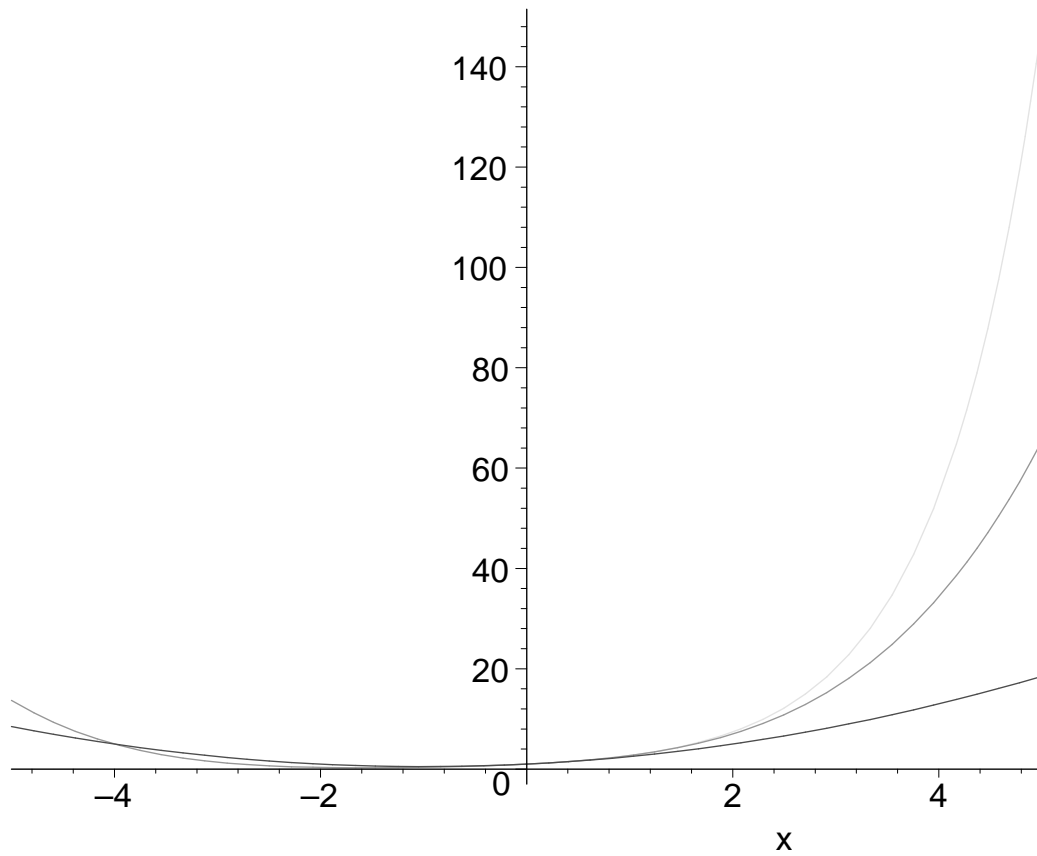
```
> p:=n->convert(taylor(exp(x),x=0,n+1),polynom);
```

$$p := n \rightarrow \text{convert}(\text{taylor}(e^x, x = 0, n + 1), \text{polynom})$$

```
> p(4);
```

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

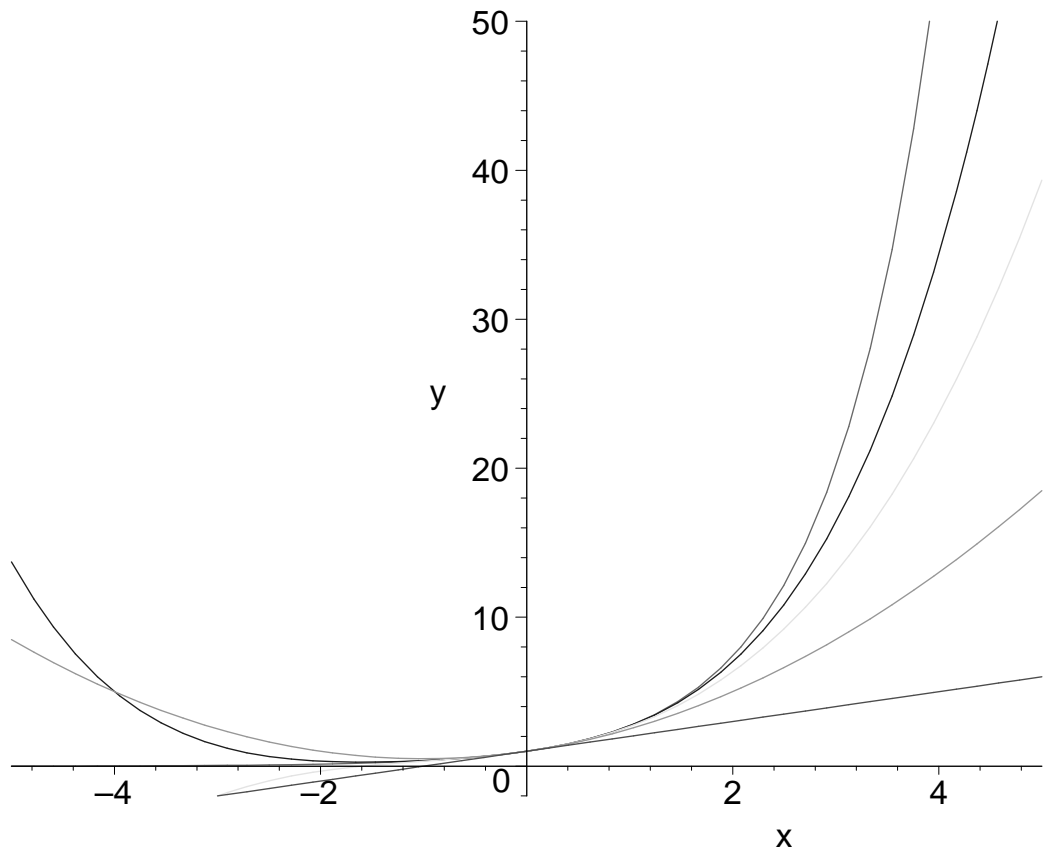
```
> plot([p(2),p(4),exp(x)],x=-5..5);
```



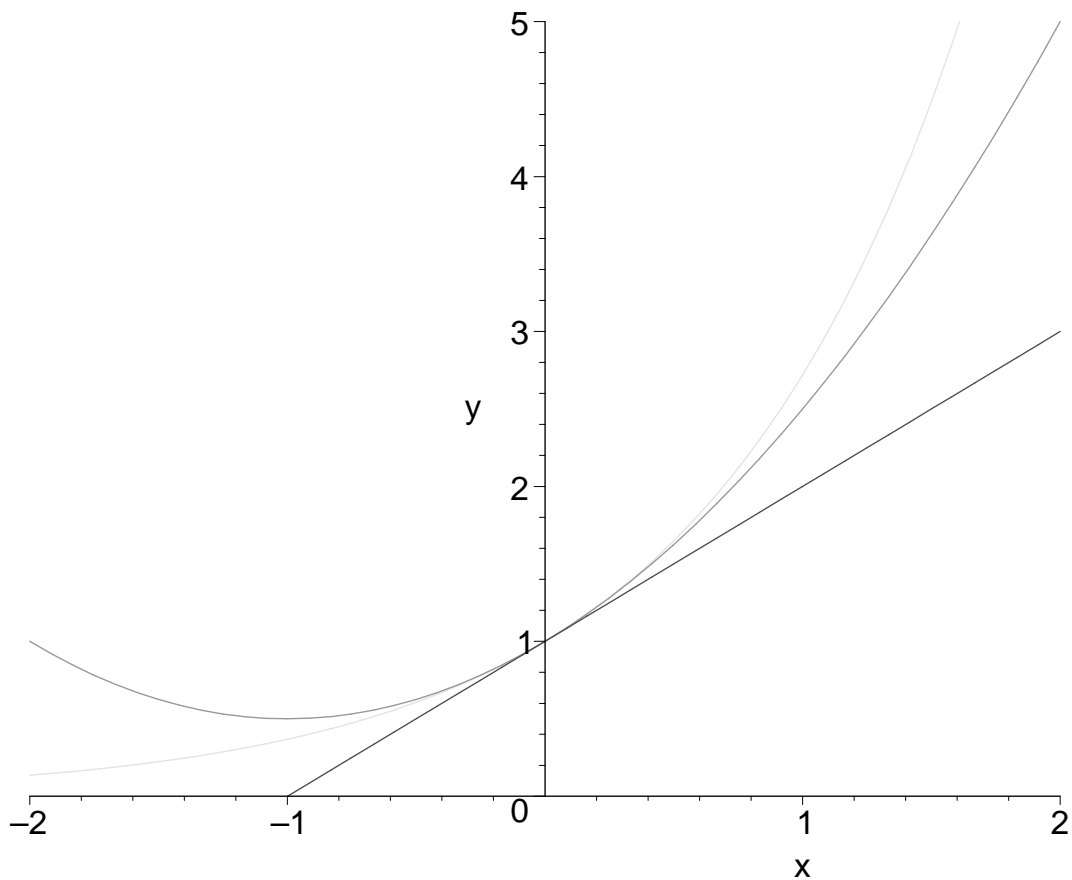
```
> seq(sin(j), j=1..4);
```

```
sin(1), sin(2), sin(3), sin(4)
```

```
> plot([seq(p(j), j=1..4), exp(x)], x=-5..5, y=-2..50);
```



```
> plot([seq(p(j), j=1..2), exp(x)], x=-2..2, y=0.  
.5);
```



```
> p:=n->convert(taylor(sin(x),x=Pi/3,n+1),polynom);
```

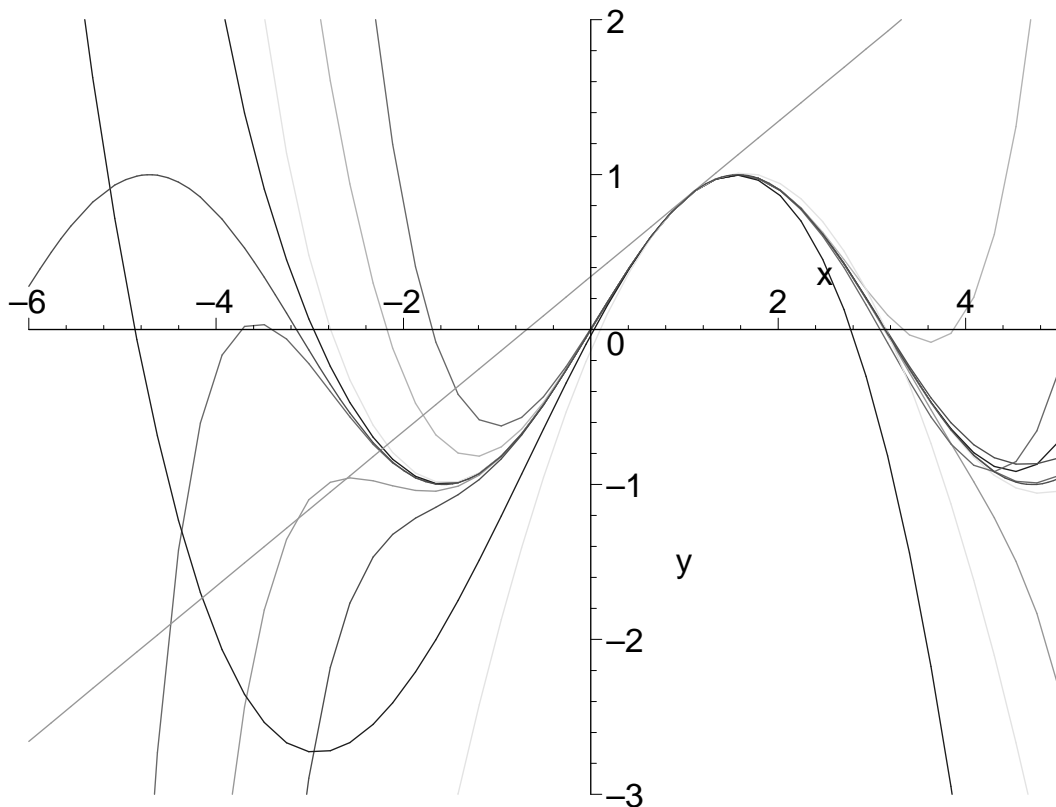
$$p := n \rightarrow \text{convert} \left(\text{taylor} \left(\sin(x), x = \frac{1}{3} \pi, n + 1 \right), \text{polynom} \right)$$

```
> p(8);
```

$$\begin{aligned} & \frac{1}{2} \sqrt{3} + \frac{1}{2} x - \frac{1}{6} \pi - \frac{1}{4} \sqrt{3} \left(x - \frac{1}{3} \pi \right)^2 - \frac{1}{12} \left(x - \frac{1}{3} \pi \right)^3 \\ & + \frac{1}{48} \sqrt{3} \left(x - \frac{1}{3} \pi \right)^4 + \frac{1}{240} \left(x - \frac{1}{3} \pi \right)^5 - \frac{1}{1440} \sqrt{3} \left(x - \frac{1}{3} \pi \right)^6 \end{aligned}$$

$$-\frac{1}{10080}\left(x-\frac{1}{3}\pi\right)^7+\frac{1}{80640}\sqrt{3}\left(x-\frac{1}{3}\pi\right)^8$$

```
> plot([sin(x),seq(p(j),j=1..10)],x=-6..5,y=-3..2);
```



```
> f:=exp(sqrt(x));
```

$$f:=e^{(\sqrt{x})}$$

```
> taylor(f,x=0,3);
```

Error, does not have a taylor expansion, try series()

```
> series(f,x=0,3);
```

$$1+\sqrt{x}+\frac{1}{2}x+\frac{1}{6}x^{(3/2)}+\frac{1}{24}x^2+\frac{1}{120}x^{(5/2)}+O(x^3)$$

```
> f:=cos(x-y)-cos(x*y);
```

$$f := \cos(x - y) - \cos(xy)$$

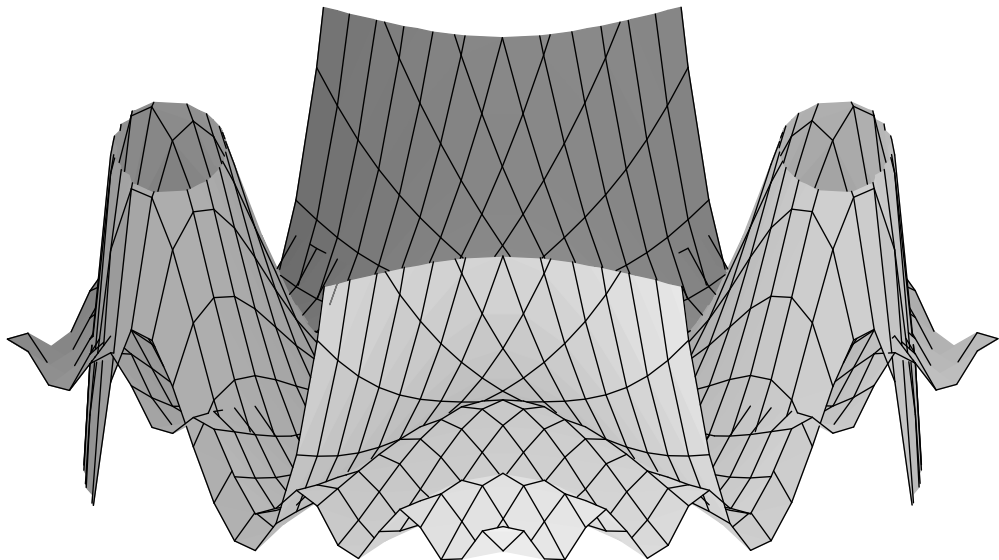
```
> mt:=n->mtaylor(f,[x=0,y=0],n+1);
```

$$mt := n \rightarrow \text{mtaylor}(f, [x=0, y=0], n+1)$$

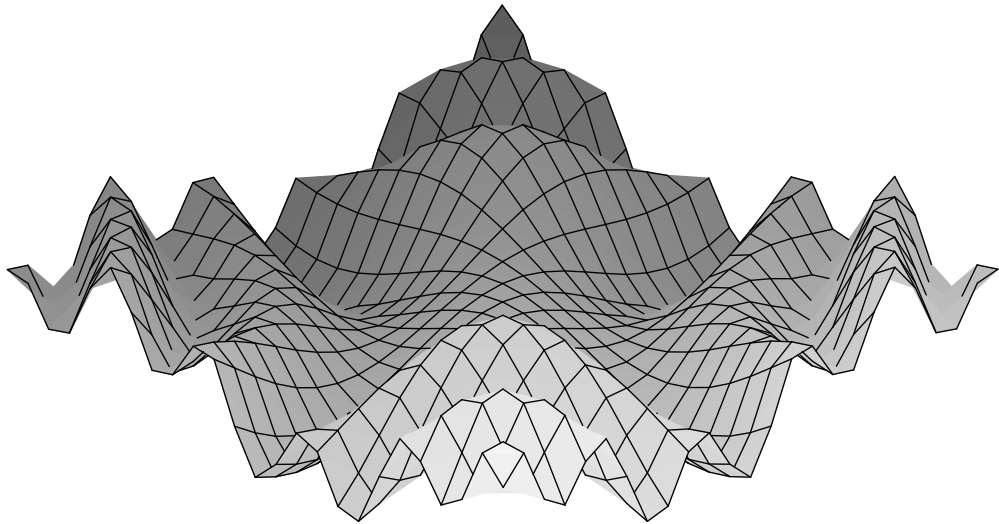
```
> mt(6);
```

$$\begin{aligned} & -\frac{1}{2}x^2 + xy - \frac{1}{2}y^2 + \frac{1}{24}x^4 - \frac{1}{6}yx^3 + \frac{3}{4}x^2y^2 - \frac{1}{6}y^3x + \frac{1}{24}y^4 - \frac{1}{720}x^6 \\ & + \frac{1}{120}yx^5 - \frac{1}{48}y^2x^4 + \frac{1}{36}x^3y^3 - \frac{1}{48}y^4x^2 + \frac{1}{120}y^5x - \frac{1}{720}y^6 \end{aligned}$$

```
> plot3d({f,mt(6)},x=-4..4,y=-4..4,view=-4..8);
```



```
> plot3d(f,x=-4..4,y=-4..4,view=-4..4);
```



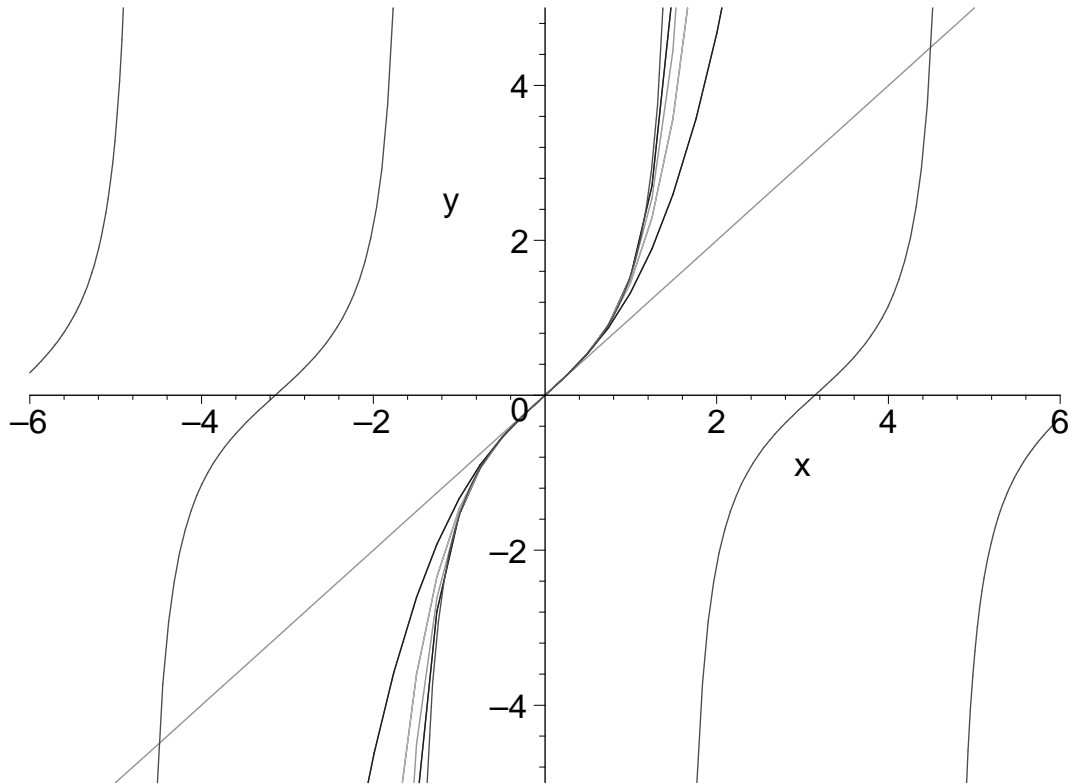
```
> p:=n->convert(taylor(tan(x),x=0,n+1),polynom);
```

```
      p := n → convert(taylor(tan(x), x = 0, n + 1), polynom)
```

```
> p(8);
```

$$x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \frac{17}{315}x^7$$

```
> plot([tan(x),seq(p(j),j=1..10)],x=-6..6,y=-5..5,discont=true);
```

```
> pade := (m, n) -> convert(taylor(tan(x), x=0, m+n+1), ratpoly, m, n);
```

```
pade :=
```

```
(m, n) -> convert(taylor(tan(x), x=0, m+n+1), ratpoly, m, n)
```

```
> pade(4, 2);
```

$$\frac{-\frac{1}{15}x^3 + x}{1 - \frac{2}{5}x^2}$$

```
>
```