

pem34

(problemas evaluables de matemáticas 3 y 4)

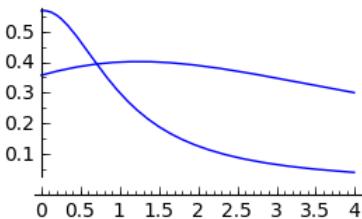
Evaluables 3.

Problema 1.

```
var('n');an(x,n)=(n+5)*x^(3*n)/(n^2+14)/8^n
sum(an(-x,n),n,1,4);n(-1/20),sum(an(-1,n),n,1,1000).n()
3/40960*x^12 - 1/1472*x^9 + 7/1152*x^6 - 1/20*x^3
(-1/20, -0.0445367844161796)

var('n');bn(x,n)=(n+17)*x^(3*n)/(n^2+1)/27^n
sum(bn(-x,n),n,1,4);n(-1/3),sum(bn(-1,n),n,1,1000).n()
7/3011499*x^12 - 2/19683*x^9 + 19/3645*x^6 - 1/3*x^3
(-1/3, -0.328220056818901)

plot([(n+5)/(n^2+14),(n+17)/(n^2+1)/30],0,4,figsize=[3,1.5])
```



Problemas 2.

```
ag(x)=exp(x)*arctan(x)-x*(1+3*x)^(1/3)
taylor(ag(x),x,0,5),limit(ag(x)/x^3,x=0),limit(ag(x)/x^3,x=oo)
(409/120*x^5 - 11/6*x^4 + 7/6*x^3, 7/6, +Infinity)

bg(x)=exp(-x)*arctan(x)-x*(1-2*x)^(1/2)
taylor(bg(x),x,0,5),limit(bg(x)/x^3,x=0),limit(bg(x)/x^3,x=-oo)
(7/10*x^5 + 2/3*x^4 + 2/3*x^3, 2/3, +Infinity)

diff(ag(x),x,3);_.subs(x=0)
e^x*arctan(x) + 3*e^x/(x^2 + 1) - 6*x*e^x/(x^2 + 1)^2 +
8*x^2*e^x/(x^2 + 1)^3 - 2*e^x/(x^2 + 1)^2 + 6/(3*x + 1)^(5/3) -
10*x/(3*x + 1)^(8/3)
7

diff(bg(x),x,3);_.subs(x=0)
-e^(-x)*arctan(x) + 3*e^(-x)/(x^2 + 1) + 6*x*e^(-x)/(x^2 + 1)^2
8*x^2*e^(-x)/(x^2 + 1)^3 - 2*e^(-x)/(x^2 + 1)^2 + 3/(-2*x + 1)^(5/2)
4
```

Evaluables 4:

Problemas 1.

```
integral(sin(x)^3/cos(x),x);integral(sin(x)^3/cos(x),x,pi/4,pi/3)
-1/2*sin(x)^2 - 1/2*log(sin(x)^2 - 1)
-1/2*log(2) + 1/2*log(4) - 1/8

integral(cos(x)^3/sin(x),x);integral(cos(x)^3/sin(x),x,pi/6,pi/4)
-1/2*sin(x)^2 + log(sin(x))
1/2*log(2) - 1/8

integral(log(x)/(x-2)^2,x);integral(log(x)/(x-2)^2,x,3,4)
-log(x)/(x - 2) + 1/2*log(x - 2) - 1/2*log(x)
1/2*log(2) + 3/2*log(3) - log(4)

integral(log(x+2)/x^2,x);integral(log(x+2)/x^2,x,1,2)
-log(x + 2)/x - 1/2*log(x + 2) + 1/2*log(x)
1/2*log(2) + 3/2*log(3) - log(4)
```

Problemas 2.

```
Ha=integral(exp(-x^4),x,5-2*x,1)
Hb=integral(exp(-x^6),x,2*x-1,1) # (se aburre operando)
^CControl-C pressed. Interrupting Maxima. Please wait a few
seconds...
Traceback (click to the left of this block for traceback)
...
__SAGE__
ia=integral(exp(-x^4),x,-1,1);ib=integral(exp(-x^6),x,-1,1)
ia;ib;n(ia),n(ib)
1/2*I*gamma(1/4) - 1/2*I*gamma_incomplete(1/4, 1)
1/6*(I*sqrt(3) + 1)*(gamma(1/6) - gamma_incomplete(1/6, 1))
Traceback (click to the left of this block for traceback)
...
TypeError: cannot evaluate symbolic expression numerically
numerical_integral(exp(-x^4),-1,1)
(1.6896771895142046, 1.8759185199825941e-14)
```

Problemas 3.

```
var('a,t')
integral(1/sqrt(x-a)/(x+4-a),x,a,oo),integral(2/(4+t^2),t)
(1/2*pi, arctan(1/2*t))
numerical_integral(exp(-x^6),-1,1)
(1.776527397503874, 1.9723416205862089e-14)
```