First page

```
limit(((2*x - 3)^3-(x+ 5)^3)/((3*x-1)^3+(2*x + 3)^3), x, inf);

limit(((x^3 - 7)^(1/3) + (x^2 + 4)^(1/3))/( (x^5 + 5)^(1/4) + x^(1/2)), x, inf);

limit(((n*(n^5 + 9))^(1/2) - ((n^4 - 1)*(n^2 + 5))^(1/2) )/n, n, inf);

limit( (n+2)*2/( n*(n+1) ) - 2/3,n,inf );

k:( (x+3)/(x+5) )^(x + 4 ) $;
limit(k, x, inf);

limit((6*x^2 + x - 1)/( x - 1/3), x, 1/3);

limit( (x^3 - 6*x^2 + 12*x -8)/(x^3 -3*x^2 +4)  , x , 2);

limit( ( (16*x)^(1/3) - 4)/( sqrt(x+4) - sqrt(x*2))  , x , 4);

limit( 2*sin(%pi * (x + 1) )/log(2*x + 1) , x, 0);

limit( (log(2*x) - log(%pi))/( sin(5*x/2)*cos(x) ) , x, %pi/2);

limit( log(2*x - 5)/( exp( sin(%pi*x) ) - 1 ) ,x,3);

limit( ( 7^(3*x) - 3^(2*x) )/( tan(x) + x^3), x, 0);

limit( ( exp(sin(2*x)) - exp(sin(x)) )/tan(x),x,0);

limit((2 - exp(x^2))^(1/log(1 + (tan(%pi*x/3))^2 )), x, 0);

limit( ( ( 2^(x*2) - 1 )/(x)  )^(x+1),x,0);

limit( ( 2*%e^(x-1) - 1 )^( x/(x-1) ), x ,0);

limit( ( sin(x) + cos(x) )^(1/tan(x)) ,x,%pi/4);

limit(sqrt(5*cos(x) + atan(x)*(sin(1/x))^2),x,0);
```

Second page

```
a:( x^5 + 1 )/( x^4 + 1 )$;
g:diff(a,x,1)$;
b:ev(g,x=2)$;
c:ev(a,x=2)$;
print(y - x*b - c + 2*b = 0)$;

diff(log(abs((x + sqrt(x^2 + 1))/(2*x))),x,1);

diff( sqrt(2*x+3)*(x-2)/(x^2),x,1);

diff( asin(exp(-x)) +log(exp(x) +sqrt(exp(2*x) - 1))  ,x,1);
```

```
diff( log(cos((2*x+3)/(2*x+1))),x,1);

diff( (cot(sin(1/3))*sin(17*x)^2)/(17*cos(34*x)) ,x,1);

diff( sqrt(-x^2+6*x-8)*(x-3)/2 + asin(x/2 - 1), x ,1);

diff( -sinh(x)/(2*(cosh(x))^2) +3/2*asin(tanh(x)) , x ,1);

diff( (sin(x))^(5*x/2)  , x ,1);

diff( atan((x-1)/sqrt(2))*1/sqrt(2) + (x-1)/(x^2 - 2*x + 3) , x ,1);

diff( (x-2)*sqrt(x+1)/3 + log(sqrt(x+1) + 1)  , x ,1);
```

Third page

```
diff( atan( 2*sin(x)/sqrt(9*(cos(x))^2 - 4) ),x,1);

xt : diff( acos(1/t),t,1)$;
yt : diff( sqrt(t^2 - 1) + asin(1/t) ,t,1)$;
ratsimp(yt/xt);

xt : diff( a*(t*sin(t) + cos(t)),t,1)$;
yt : diff( a*(sin(t) - t*cos(t)) ,t,1)$;
valuey:ratsimp( ev(a*(sin(t) - t*cos(t)),t =%pi/4) )$;
valuex:ratsimp( ev(a*(t*sin(t) + cos(t)),t =%pi/4) )$;
k:ratsimp(yt/xt)$;
proizv : ev(ratsimp( y - k*x - valuey + k*valuex = 0),t =%pi/4) ;
norma : ev(ratsimp( y + x/k -  valuey - valuex/k = 0),t =%pi/4);

diff((1 - x - x^2)*exp((x-1)/2),x,4);

xt : diff( sqrt(t-3) ,t,1)$;
yt : diff(  log(t-2) ,t,1)$;
yx : (yt/xt)$;
yxt : diff( yx ,t,1)$;
ratsimp(yxt/xt);

y : - sqrt(2/x^2 - 1)$;
1 + y^2 + x*y*diff(y,x,1);

k:diff( - (x^2)/2 + 8/x + 8,x,1)$;
DataList:solve(%,x)$;
f1:ev(k,x = -4);
f2:ev(k,x = -1);
f3:subst(DataList,k);
pop(DataList)$;
f4:subst(DataList,k);
pop(DataList)$;
f5:subst(DataList,k);
max:-1000;
min:1000;
```

5.17

6.17

integrate((5*x + 6)*cos(2*x), x);

integrate((x^2 + 6*x + 9)*sin(2*x), x, 0, -3);

integrate((x^2 + 1)/(x^3 + 3*x + 1)^5 , x);

integrate(1 / (x*sqrt(x^2 + 1)) ,x,sqrt(8),sqrt(3));

integrate((2*x^5 - 8*x^3 +3)/(x^2 - 2*x),x);

integrate((2*x^3 + 6*x^2 + 7*x + 4)/((x+2)*(x+1)^3),x);

integrate((x^3 + x +1)/((x^2 + x +1)*(x^2 + 1)) ,x);

integrate(cos(x)/(1 + cos(x) - sin(x)),x,0,-2*%pi/3);

integrate((7 + 3*tan(x))/(sin(x) + 2*cos(x))^2 ,x,%pi/4,0);

integrate(2^4*(sin(x/2))^6*(cos(x/2))^2 ,x,%pi,0);

integrate(sqrt((3 - 2*x)/(2*x - 7)),x,3,2);

integrate(1/(64 - x^2)^(3/2) ,x,4*sqrt(3),0);

integrate((1 + sqrt(x))^(4/5)/x^(19/10),x);

14.17

15.17

16.17

17.17

18.17

19.17

ode2((y + y*x^2)*'diff(y,x) = 6*x + 3 *x*y^2, y, x);

ode2(2*'diff(y,x) = y^2/x^2 + 8*y/x + 8, y, x);

ode2('diff(y,x) = (x + 2*y - 3)/(x-1), y, x);

t:ode2('diff(y,x) - 2*x*y/(1 + x^2) = 1 + x^2, y, x)$;
ic1(t,x=1,y=3);

```
t:ode2(sin(2*y) = ( (sin(2*y))^2 - 2*(sin(y))^2 + 2*x )*'diff(y,x), y, x)$;
ic1(t,x=1/4,y=2);

t:ode2('diff(y,x) + 2*x*y = 2*x^3*y^3, y, x)$;
ic1(t,x=0,y=sqrt(2));

ode2('diff(y,x)*(5*x^2 + x*cos(y)/( sin(y) )^2 - y^2*sin(y^3)) = 1/sin(y) - 10*x*y, y, x);
```

Sixth page

10.17

11.17

12.17

13.17

```
ode2('diff(y,x,2) + 6*'diff(y,x,1) + 13*y = exp(-3*x)*cos(x), y, x);

ode2('diff(y,x,2) + 36*y = 24*sin(6*x) - 12*cos(6*x) + 36*exp(6*x), y, x);
```

16.17

1.17

```
a:[3,2,-4]$;
b:[4,1,-2]$;
c:[5,2,-3]$;
M:matrix(a,b,c);
determinant(M);
```

Seventh page

```
load(simplify_sum)$
simplify_sum(sum(36/(n^2 -12*n + 35),n,9,inf));

a_n:atan( n ^ (-3) )*n^(1/3)$
a_n1:ev(a_n,n=n+1)$
limit(n*(a_n/a_n1 - 1),n,inf)$;
if (% < 1) then print("Расходится") else print("Сходится")$

a_n:( (n!)^2 )/( (3^n + 1)*( (2*n)! ) )$
a_n1:ev(a_n,n=n+1)$
limit(a_n1/a_n,n,inf)$
if (% < 1) then print("Сходится") else print("Расходится")$

a_n: ( 2^(n+1) )/(n^n) $
a_n1:ev(a_n,n=n+1)$
```

```
limit(a_n1/a_n,n,inf)$;
if (% > 1) then print("Расходится") else print("Сходится")$

a_n: 1/(n*log( n - 1 ))$
limit(a_n^(1/2),n,inf)$;
if (% > 1) then print("Расходится") else print("Сходится")$
```