▼ 1

```
> restart:
  f1:=unapply(exp(-sin(x)*cos(y)),x,y);
  plot3d(f1(x,y),x=-Pi..Pi,y=-Pi..Pi);
```

$$f1 := (x, y) \rightarrow e^{-\sin(x)\,\cos(y)}$$
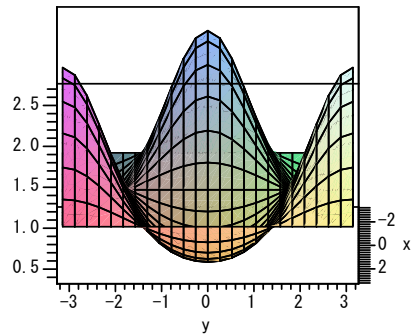

```
> evalf(f1(Pi/2,Pi));
```

$$2.718281828 \tag{1.1}$$

```
> diff(log(sin(x)^2),x);
```

$$\frac{2\cos(x)}{\sin(x)} \tag{1.2}$$

```
> int(sin(x)/(1+cos(x)^2),x=0..Pi/2);
```

$$\frac{1}{4}\pi \tag{1.3}$$

▼ 2

```
> restart:
  with(LinearAlgebra):
  A:=Matrix([[a,3],[4,b]]);
```

$$A := \begin{bmatrix} a & 3 \\ 4 & b \end{bmatrix} \tag{2.1}$$

```
> X:=Vector([t,2*t-2]);
```

$$X := \begin{bmatrix} t \\ 2t-2 \end{bmatrix} \tag{2.2}$$

```
> X2:=A.X;
```

$$X2 := \begin{bmatrix} at+6t-6 \\ 4t+b\,(2t-2) \end{bmatrix} \tag{2.3}$$

```
> Eq1:=3*X2[1]-4*X2[2]+10=0;;
```

$$Eq1 := 3\,at+2t-8-4\,b\,(2t-2)=0 \tag{2.4}$$

```
> collect(Eq1,t);
```

$$(3\,a+2-8\,b)\,t-8+8\,b=0 \tag{2.5}$$

```
> solve({coeff(lhs(Eq1),t,1)=0,coeff(lhs(Eq1),t,0)=0},{a,b});
```

$$\{b=1, a=2\} \tag{2.6}$$

▼ 3

```
> restart;
  f:=x->x^2;
  df:=unapply(diff(f(x),x),x);
```

$$f := x \rightarrow x^2$$

$$df := x \rightarrow 2x \tag{3.1}$$

```
> f(1)-f(0);
```

$$1 \tag{3.2}$$

```
> x0:=solve(f(1)-f(0)=df(x));
```

$$x0 := \frac{1}{2} \tag{3.3}$$

```
> plot([f(x),df(x0)*(x-x0)+f(x0),x],x=0..1,color=black);
```
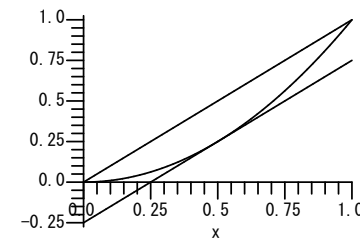
▼ 4

```
> restart:
  roll:=rand(1..100);
  n:=5;
  A:=Array([seq(roll(),i=1..n)]);
```

$$roll := \mathbf{proc}()$$
$$\quad \mathbf{proc}()$$
$$\qquad \mathbf{option}\ builtin;$$
$$\qquad 394$$
$$\quad \mathbf{end\ proc}\ (6, 100, 7) + 1$$
$$\mathbf{end\ proc}$$

$$n := 5$$

$$A := \begin{bmatrix} 93 & 45 & 96 & 6 & 98 \end{bmatrix} \qquad (4.1)$$

```
> i_h:=0;i_l:=0;
  i_div:=50;
  for i from 1 to n do
   if (A[i]<i_div) then
    i_l:=i_l+1;
   else
    i_h:=i_h+1;
   end if;
  end do;
  print(i_h,i_l);
```

$$i\_h := 0$$
$$i\_l := 0$$
$$i\_div := 50$$
$$3, 2 \qquad (4.2)$$

▼ 5

```
> restart;
  n:=10;
  A:=Array([seq(i,i=1..n)]);
```

$$n := 10$$

$$A := \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 \end{bmatrix} \qquad (5.1)$$

```
> roll:=rand(1..n);
```

$$roll := \mathbf{proc}()$$
$$\quad \mathbf{proc}()$$
$$\qquad \mathbf{option}\ builtin;$$
$$\qquad 394$$
$$\quad \mathbf{end\ proc}\ (6, 10, 4) + 1$$
$$\mathbf{end\ proc}$$

(5.2)

```
> for i from 1 to 20 do
   j1:=roll();
   j2:=roll();
   tmp:=A[j1];
   A[j1]:=A[j2];
   A[j2]:=tmp;
  end do:
  print(A);
```

$$\begin{bmatrix} 8 & 4 & 2 & 7 & 1 & 3 & 6 & 10 & 5 & 9 \end{bmatrix} \qquad (5.3)$$

```
>
```