▼ 1

```
> restart:
  f:=T->(1+exp(-1/T))/(1-exp(-1/T));
  evalf(f(2));
```

$$f := T \to \frac{1+e^{-\frac{1}{T}}}{1-e^{-\frac{1}{T}}}$$

$$4.082988166 \tag{1.1}$$

```
> diff(sin(x)^3*cos(x)^6,x);
```

$$3\sin(x)^2\cos(x)^7 - 6\sin(x)^4\cos(x)^5 \tag{1.2}$$

```
> int(log(sin(x)),x=0..Pi/2);
```

$$-\frac{1}{2}\pi\ln(2) \tag{1.3}$$

```
> plot3d([3*x-2*y-2,x+y^2+4],x=-10..10,y=-10..10,color=[green,red]);
```
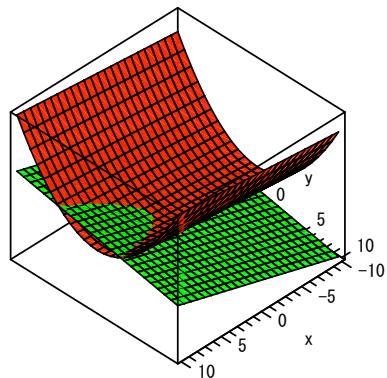

▼ 2

```
> restart:
  f:=x->a*x^2+b*x+c;
```

$$f := x \to ax^2 + bx + c \tag{2.1}$$

```
> eq1:={f(1)=2,
  f(-3)=4,f(-1)=1};
```

$$eq1 := \{a+b+c=2, 9a-3b+c=4, a-b+c=1\} \tag{2.2}$$

```
> solve(eq1,{a,b,c});
```

$$\left\{c=1, b=\frac{1}{2}, a=\frac{1}{2}\right\} \tag{2.3}$$

```
> restart;
  f:=x->4*x^2-3*x+1;
```

$$f := x \to 4x^2 - 3x + 1 \tag{2.4}$$

```
> a:=unapply(diff(f(x),x),x);
  x0:=2/3;
```

$$a := x \to 8x - 3$$

$$x0 := \frac{2}{3} \tag{2.5}$$

```
> plot([f(x),a(x0)*(x-x0)+f(x0)],x=-1..2,y=-2..5);
```
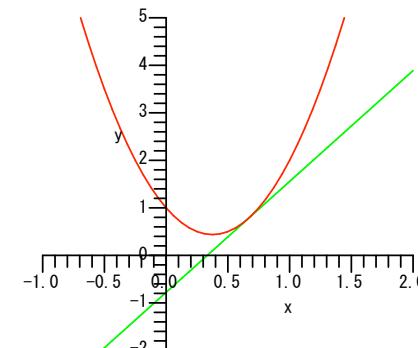

▼ 3

```
> restart;
  x0:=15;
  s:=5;
```

$$x0 := 15$$

$$s := 5 \tag{3.1}$$

```
> f:=x->exp(-(x-x0)^2/(2*s^2));
```

$$f := x \to e^{-\frac{1}{2}\frac{(x-x0)^2}{s^2}} \tag{3.2}$$

```
> plot([f(x),diff(f(x),x),diff(f(x),x,x)],x=0..30,color=black);
```
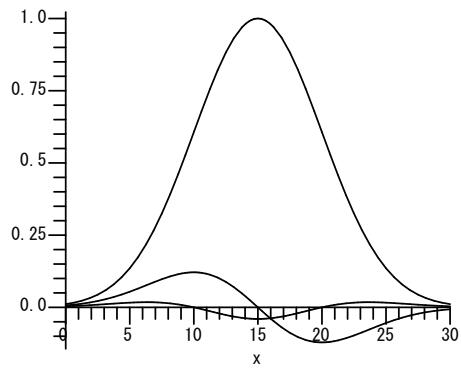
```
> solve(diff(f(x),x)=0,x);
  solve(diff(f(x),x,x)=0,x);
```

$$15$$

$$20, 10 \tag{3.3}$$

▼ 4

```
> restart;
  f:=Array(1..20):
  f[1]:=1;
  f[2]:=1;
```

$$f_1 := 1$$

$$f_2 := 1 \tag{4.1}$$

```
> for i from 3 to 20 do
    f[i]:=f[i-1]+f[i-2];
  end do:
  f[20];
```

$$6765 \tag{4.2}$$

▼ 5
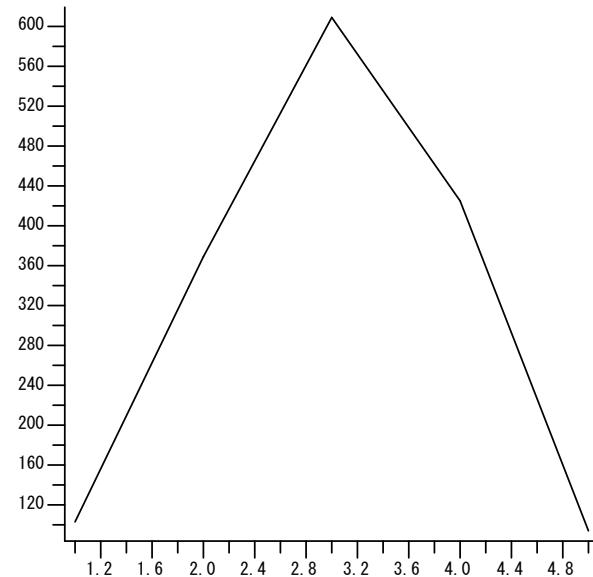
```
> box:=Array(1..5,0):
  toss:=rand(0..1):
  for j from 1 to 1600 do
  pos:=3;
```

```
  for i from 1 to 4 do
    if (toss()=0) then
      pos:=pos+1/2;
    else
      pos:=pos-1/2;
    end if;
  end do;
  box[pos]:=box[pos]+1;
  end do:
  print(box);
```

$$\begin{bmatrix} 103 & 369 & 609 & 425 & 94 \end{bmatrix} \tag{5.1}$$

```
> with(plots):
  listplot(box);
```



```
> expand((1+x)^4);
```

$$1+4x+6x^2+4x^3+x^4 \tag{5.2}$$