```
> bisect:=proc(f,left,right, err)
   local mid,a,b, n;
   a:=left;
   b:=right;
    n := 0;
   while b - a > 2*err do
    mid:=evalf((a+b)/2):
      if evalf(f(a)*f(mid)) < 0 then
         b:=mid
       else
         a:=mid
       fi;
    n := n+1;lprint(n,mid,(b - a)/2);
   od;
   end:
```

```
> newton := proc(f,a,err)
   local x0, x1, n, conv:
     n := 0: conv := 10:
     x0 := a:
   while conv > err do
   x1 := evalf(x0 - f(x0)/D(f)(x0)):
    n := n+1:
    conv := abs(x0 - x1):
   x0 := x1:
    lprint(n,x1,conv):
   od:
  end:
>
```

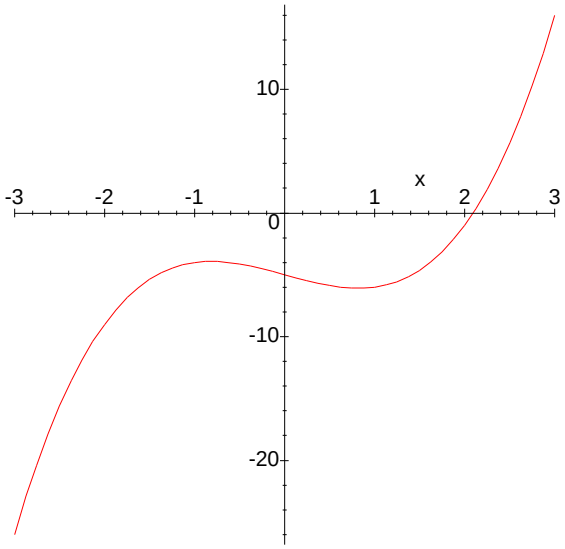
```
> secant :=proc(f,a,b,err)
    local x0,x1,x2,n,conv:
   n:=0:conv:=10:
    x0:=a: x1:=b:
   while conv > err do
   x2:= evalf((x0*f(x1)-x1*f(x0))/(f(x1)-f(x0))):
   n:= n+1:
  conv:= abs(x2-x1):
   x0:=x1:x1:=x2:
   lprint(n,x2,conv):
  od:
  end:
```

```
> mnewton := proc(f,a,err)
   local x0, x1, n, sl,conv:
     n := 0: conv := 10:
     x0 := a: sl:=D(f)(a):
   while conv > err do
   x1 := evalf(x0 - f(x0)/sl):
    n := n+1:
```

```
    conv := abs(x0 - x1):
   x0 := x1:
    lprint(n,x1,conv):
   od:
  end:
> 
> f:=x->x^3-2*x-5;
```

$$f := x \to x^3 - 2\,x - 5$$

```
> plot(f(x),x=-3..3);
```




```
> newton(f,2,10^(-6));
1   2.100000000   .100000000
2   2.094568121   .5431879e-2
3   2.094551482   .16639e-4
4   2.094551482   0
> secant(f,2,2.2,10^(-6));
> 
1   2.088967972   .111032028
2   2.094232956   .5264984e-2
3   2.094552486   .319530e-3
4   2.094551481   .1005e-5
5   2.094551481   0
> bisect(f,2,2.2,10^(-6));
1   2.100000000   .50000000e-1
2   2.050000000   .25000000e-1
3   2.075000000   .12500000e-1
4   2.087500000   .6250000e-2
5   2.093750000   .3125000e-2
6   2.096875000   .1562500e-2
7   2.095312500   .781250e-3
8   2.094531250   .390625e-3
9   2.094921875   .195313e-3
10   2.094726563   .97657e-4
11   2.094628907   .48829e-4
12   2.094580079   .24415e-4
13   2.094555665   .12208e-4
14   2.094543458   .6104e-5
15   2.094549562   .3052e-5
16   2.094552614   .1526e-5
```

```
17   2.094551088   .763e-6
> mnewton(f,2.,10^(-6));
1   2.100000000   .100000000
2   2.093900000   .6100000e-2
3   2.094626880   .726880e-3
4   2.094542721   .84159e-4
5   2.094552499   .9778e-5
6   2.094551363   .1136e-5
7   2.094551495   .132e-6
> newton(f,3,10^(-6));
1   2.360000000   .640000000
2   2.127196780   .232803220
3   2.095136037   .32060743e-1
4   2.094551674   .584363e-3
5   2.094551482   .192e-6
> mnewton(f,3,10^(-6));
1   2.360000000   .640000000
2   2.223029760   .136970240
3   2.161435950   .61593810e-1
4   2.130438503   .30997447e-1
5   2.114090921   .16347582e-1
6   2.105271132   .8819789e-2
7   2.100456332   .4814800e-2
8   2.097811295   .2645037e-2
9   2.096353255   .1458040e-2
10   2.095548024   .805231e-3
11   2.095102860   .445164e-3
12   2.094856617   .246243e-3
13   2.094720364   .136253e-3
14   2.094644958   .75406e-4
15   2.094603223   .41735e-4
16   2.094580122   .23101e-4
17   2.094567335   .12787e-4
18   2.094560257   .7078e-5
19   2.094556339   .3918e-5
20   2.094554170   .2169e-5
21   2.094552970   .1200e-5
22   2.094552305   .665e-6
> secant(f,3,4,10^(-6));
1   2.542857143   1.457142857
2   2.335376089   .207481054
3   2.142021088   .193355001
4   2.100310890   .41710198e-1
5   2.094702153   .5608737e-2
6   2.094551969   .150184e-3
7   2.094551482   .487e-6
> bisect(f,2,3,10^(-6));
1   2.500000000   .250000000
2   2.250000000   .125000000
3   2.125000000   .62500000e-1
4   2.062500000   .31250000e-1
5   2.093750000   .15625000e-1
6   2.109375000   .7812500e-2
7   2.101562500   .3906250e-2
8   2.097656250   .1953125e-2
9   2.095703125   .976563e-3
10   2.094726563   .488282e-3
11   2.094238282   .244141e-3
12   2.094482423   .122070e-3
13   2.094604494   .61035e-4
14   2.094543459   .30517e-4
15   2.094573977   .15259e-4
16   2.094558719   .7630e-5
17   2.094551090   .3815e-5
18   2.094554905   .1908e-5
```

```
19   2.094552998   .954e-6
> mnewton(f,2.6,10^(-6));
1   2.196498906   .403501094
2   2.130621053   .65877853e-1
3   2.108147840   .22473213e-1
4   2.099782467   .8365373e-2
5   2.096579108   .3203359e-2
6   2.095339662   .1239446e-2
7   2.094858200   .481462e-3
8   2.094670891   .187309e-3
9   2.094597977   .72914e-4
10   2.094569587   .28390e-4
11   2.094558532   .11055e-4
12   2.094554227   .4305e-5
13   2.094552551   .1676e-5
14   2.094551898   .653e-6
> newton(f,2.6,10^(-6));
1   2.196498906   .403501094
2   2.099956954   .96541952e-1
3   2.094567860   .5389094e-2
4   2.094551482   .16378e-4
5   2.094551482   0
> secant(f,2.6,2,10^(-6));
1   2.071633238   .71633238e-1
2   2.095831973   .24198735e-1
3   2.094534815   .1297158e-2
4   2.094551470   .16655e-4
5   2.094551482   .12e-7
>
```