

(%i1) `%e^(3/4);`

(%o1) `%e3/4`

(%i2) `%,numer`

;

(%o2) `2.117000016612675`

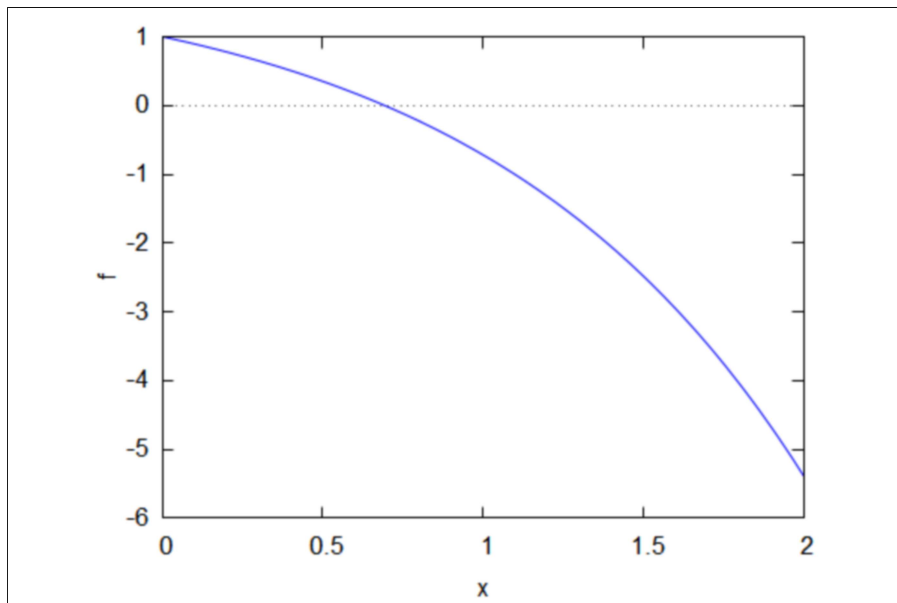
(%i3) `f(x):=2-%e^x`

;

(%o3) `f(x):=2-%ex`

(%i5) `wxplot2d([f], [x,0,2])$`

(%t5)



(%i17) `a:0;`

`b:1;`

`c:(a+b)/2;`

`f(a),numer;`

`f(c),numer;`

`f(b),numer;`

(a) 0

(b) 1

(c) $\frac{1}{2}$

(%o15) 1

(%o16) 0.3512787292998718

(%o17) -0.7182818284590451

```
(%i23) a:1/2;
      b:1;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

(a) $\frac{1}{2}$

(b) 1

(c) $\frac{3}{4}$

```
(%o21) 0.3512787292998718
```

```
(%o22) -0.1170000166126748
```

```
(%o23) -0.7182818284590451
```

```
(%i29) a:1/2;
      b:3/4;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

(a) $\frac{1}{2}$

(b) $\frac{3}{4}$

(c) $\frac{5}{8}$

```
(%o27) 0.3512787292998718
```

```
(%o28) 0.1317540425677777
```

```
(%o29) -0.1170000166126748
```

```
(%i35) a:5/8;
      b:3/4;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

(a) $\frac{5}{8}$

(b) $\frac{3}{4}$

(c) $\frac{11}{16}$

```
(%o33) 0.1317540425677777
```

```
(%o34) 0.01126253041770808
```

```
(%o35) -0.1170000166126748
```

(%i41) a:11/16;
 b:3/4;
 c:(a+b)/2;
 f(a),numer;
 f(c),numer;
 f(b),numer;

(a) $\frac{11}{16}$

(b) $\frac{3}{4}$

(c) $\frac{23}{32}$

(%o39) 0.01126253041770808

(%o40) -0.05186677348797675

(%o41) -0.1170000166126748

(%i47) a:11/16;
 b:23/32;
 c:(a+b)/2;
 f(a),numer;
 f(c),numer;
 f(b),numer;

(a) $\frac{11}{16}$

(b) $\frac{23}{32}$

(c) $\frac{45}{64}$

(%o45) 0.01126253041770808

(%o46) -0.02005552770869645

(%o47) -0.05186677348797675

(%i53) c

(a) $\frac{11}{16}$

(b) $\frac{45}{64}$

(c) $\frac{89}{128}$

(%o51) 0.01126253041770808

(%o52) -0.004335330874331245

(%o53) -0.02005552770869645

```
(%i59) a:11/16;
      b:89/128;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

$$(a) \quad \frac{11}{16}$$

$$(b) \quad \frac{89}{128}$$

$$(c) \quad \frac{177}{256}$$

```
(%o57) 0.01126253041770808
```

```
(%o58) 0.003478832038737778
```

```
(%o59) -0.004335330874331245
```

```
(%i65) a:177/256;
      b:89/128;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

$$(a) \quad \frac{177}{256}$$

$$(b) \quad \frac{89}{128}$$

$$(c) \quad \frac{355}{512}$$

```
(%o63) 0.003478832038737778
```

```
(%o64) -4.244339097745353 10-4
```

```
(%o65) -0.004335330874331245
```

```
(%i71) a:177/256;
      b:355/512;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

$$(a) \frac{177}{256}$$

$$(b) \frac{355}{512}$$

$$(c) \frac{709}{1024}$$

```
(%o69) 0.003478832038737778
```

```
(%o70) 0.001528152010193962
```

```
(%o71) -4.244339097745353 10-4
```

```
(%i77) a:709/1024;
      b:355/512;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

$$(a) \frac{709}{1024}$$

$$(b) \frac{355}{512}$$

$$(c) \frac{1419}{2048}$$

```
(%o75) 0.001528152010193962
```

```
(%o76) 5.520974029782355 10-4
```

```
(%o77) -4.244339097745353 10-4
```

```
(%i83) a:1419/2048;
      b:355/512;
      c:(a+b)/2;
      f(a),numer;
      f(c),numer;
      f(b),numer;
```

(a) $\frac{1419}{2048}$

(b) $\frac{355}{512}$

(c) $\frac{2839}{4096}$

```
(%o81) 5.520974029782355 10-4
```

```
(%o82) 6.389134934270402 10-5
```

```
(%o83) -4.244339097745353 10-4
```

```
(%i84) kill(all);
```

```
(%o0) done
```

```
(%i1) f(x):=2-%e^x;
```

```
(%o1) f(x):=2-%e^x
```

```
(%i2) df(x):="(diff(f(x),x));
```

```
(%o2) df(x):=-%e^x
```

```
(%i4) x[0]:0;
```

```
x[n]:=x[n-1]-f(x[n-1])/df(x[n-1]);
```

```
(x[0]) 0
```

```
(x[n])  $x_n := x_{n-1} - \frac{f(x_{n-1})}{df(x_{n-1})}$ 
```

```
(%i5) x[1];
```

```
(%o5) 1
```

```
(%i16) i:1;
```

```
x[i],numer;
```

```
f(x[i]),numer;
```

```
abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 1
```

```
(%o14) 1
```

```
(%o15) -0.7182818284590451
```

```
(%o16) 1.718281828459045
```

```
(%i20) i:2;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 2  
(%o18) 0.7357588823428847  
(%o19) -0.08706522863453303  
(%o20) 0.3513063462916484
```

```
(%i24) i:3;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 3  
(%o22) 0.6940422999189153  
(%o23) -0.001791040195728399  
(%o24) 0.04350762261969776
```

```
(%i28) i:4;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 4  
(%o26) 0.6931475810597714  
(%o27) -8.009998127000983 10-7  
(%o28) 8.955198589566393 10-4
```

```
(%i30) 2839/4096,numer;  
(%o30) 0.693115234375
```

```
(%i34) i:5;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 5  
(%o32) 0.6931471805600254  
(%o33) -1.603162047558726 10-13  
(%o34) 4.004999062390269 10-7
```

```
(%i35) kill(all);  
(%o0) done
```

```
(%i1) f(x):=2-%e^x;  
(%o1) f(x):=2-%e^x
```

```
(%i4) x[0]:0;
      x[1]:1;
      x[n]:=x[n-1]-f(x[n-1])·(x[n-1]-x[n-2])/(f(x[n-1])-f(x[n-2]));
```

```
(x[0]) 0
```

```
(x[1]) 1
```

```
(x[n])  $x_n := x_{n-1} - \frac{f(x_{n-1})(x_{n-1} - x_{n-2})}{f(x_{n-1}) - f(x_{n-2})}$ 
```

```
(%i8) i:2;
      x[i],numer;
      f(x[i]),numer;
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 2
```

```
(%o6) 0.5819767068693265
```

```
(%o7) 0.2104276031581664
```

```
(%o8) 0.62845089628884
```

```
(%i12) i:3;
       x[i],numer;
       f(x[i]),numer;
       abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 3
```

```
(%o10) 0.6766927037604051
```

```
(%o11) 0.03263968271906514
```

```
(%o12) 0.1273556796101438
```

```
(%i16) i:4;
       x[i],numer;
       f(x[i]),numer;
       abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 4
```

```
(%o14) 0.694081399681418
```

```
(%o15) -0.001869311280160435
```

```
(%o16) 0.01925800720117332
```

```
(%i20) i:5;
       x[i],numer;
       f(x[i]),numer;
       abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 5
```

```
(%o18) 0.6931394746449142
```

```
(%o19) 1.541177068120625 10-5
```

```
(%o20) 9.573368071850163 10-4
```



```
(%i24) i:6;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 6
```

```
(%o22) 0.6931471769609946
```

```
(%o23) 7.19790138603571 10-9
```

```
(%o24) 7.709513981768445 10-6
```

```
(%i28) i:7;  
      x[i],numer;  
      f(x[i]),numer;  
      abs(f(x[i]))+abs(x[i]-x[i-1]),numer;
```

```
(i) 7
```

```
(%o26) 0.6931471805599592
```

```
(%o27) -2.753353101070388 10-14
```

```
(%o28) 3.598992104336673 10-9
```