

[> restart : with(plots) :

▼ Funciones de una variable

[> $f := x \rightarrow x^2;$

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

(1.1)

[> $f(x);$

$$x^2$$

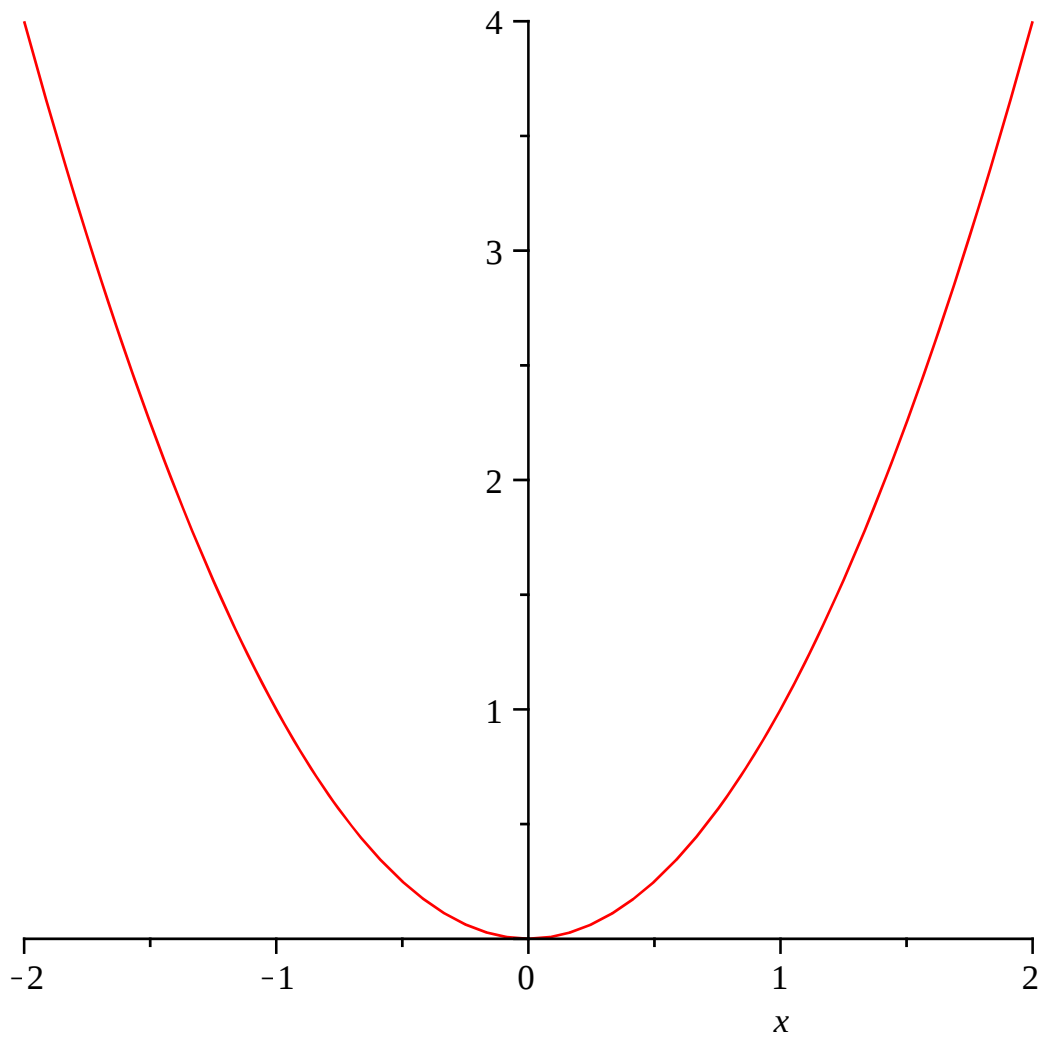
(1.2)

[> $f(6);$

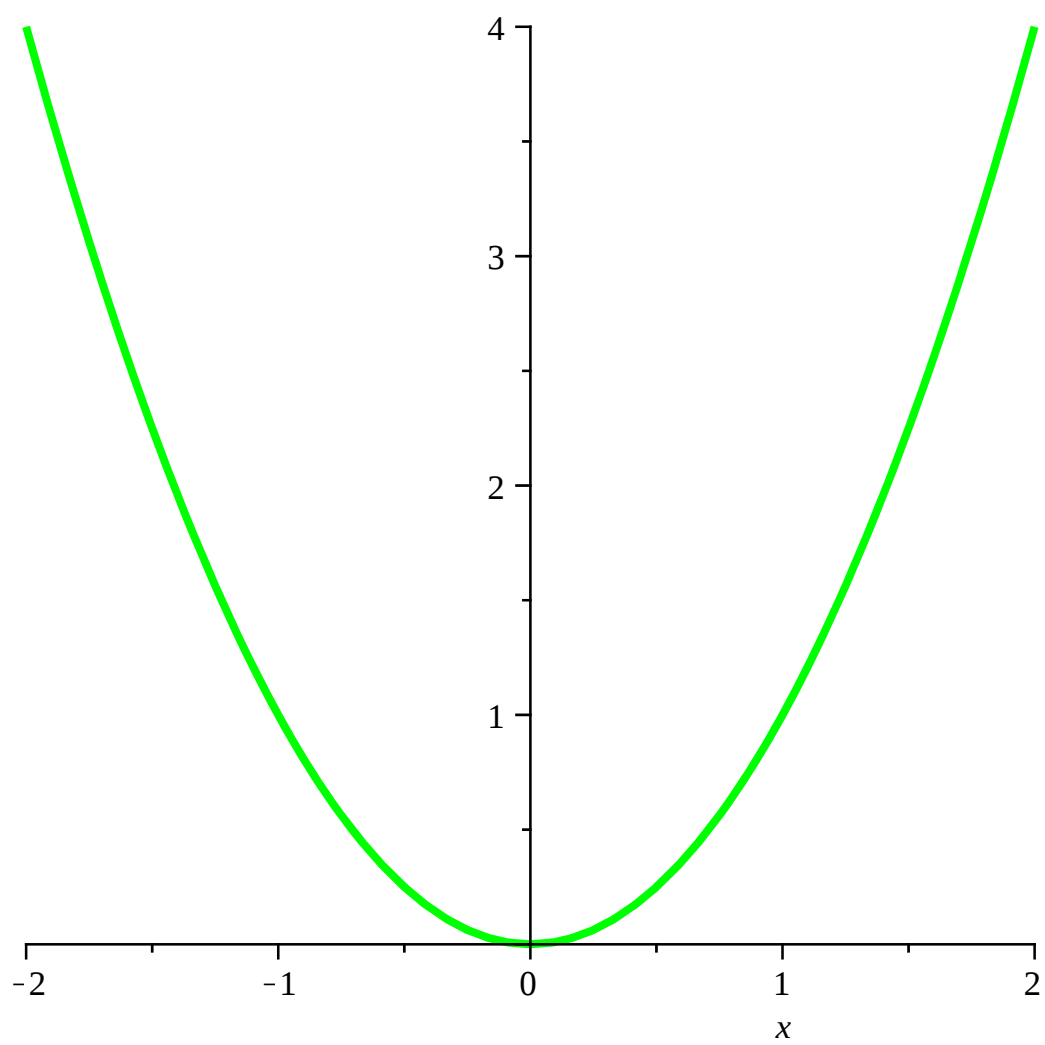
$$36$$

(1.3)

[> $\text{plot}(f(x), x = -2 .. 2);$



[> $\text{plot}(f(x), x = -2 .. 2, \text{color} = \text{green}, \text{thickness} = 3);$

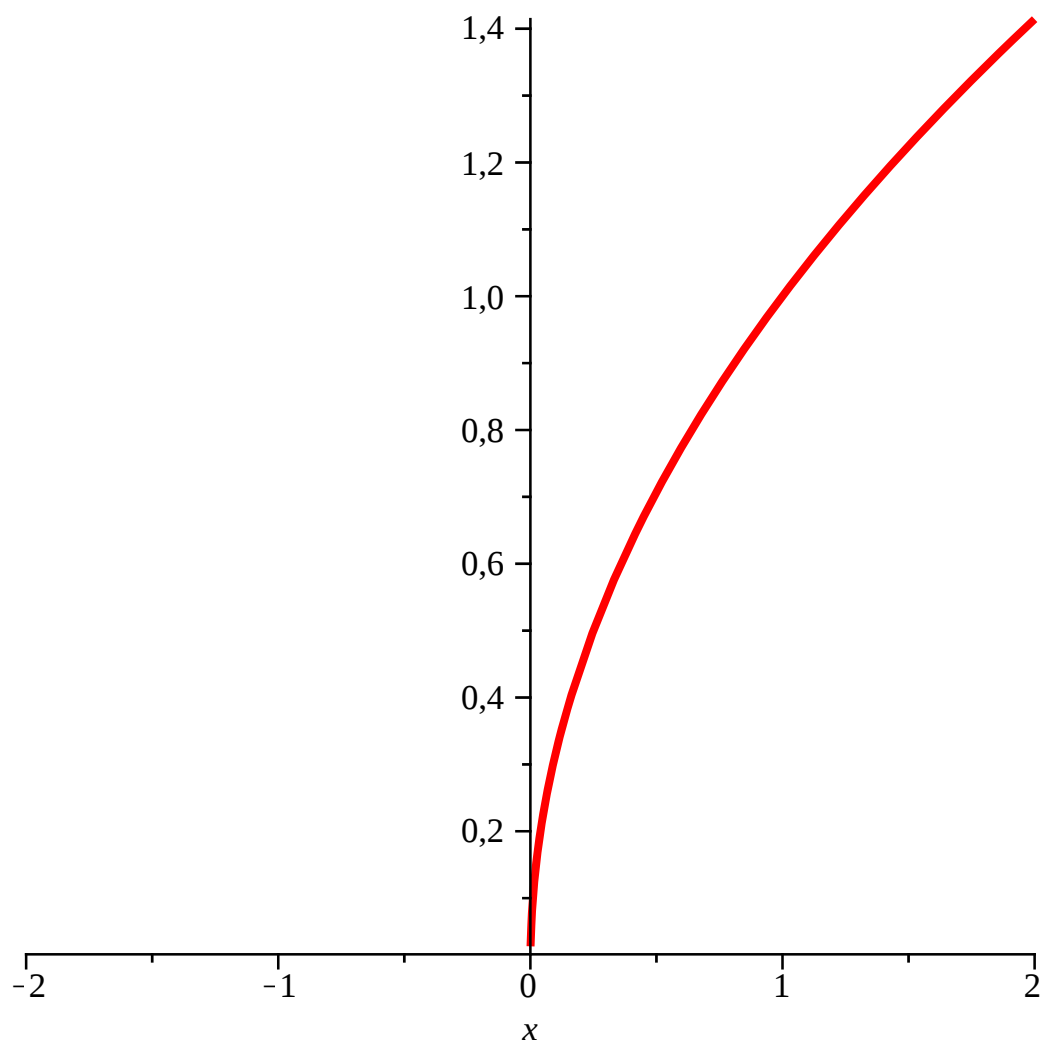


```
> g := x→sqrt(x);
```

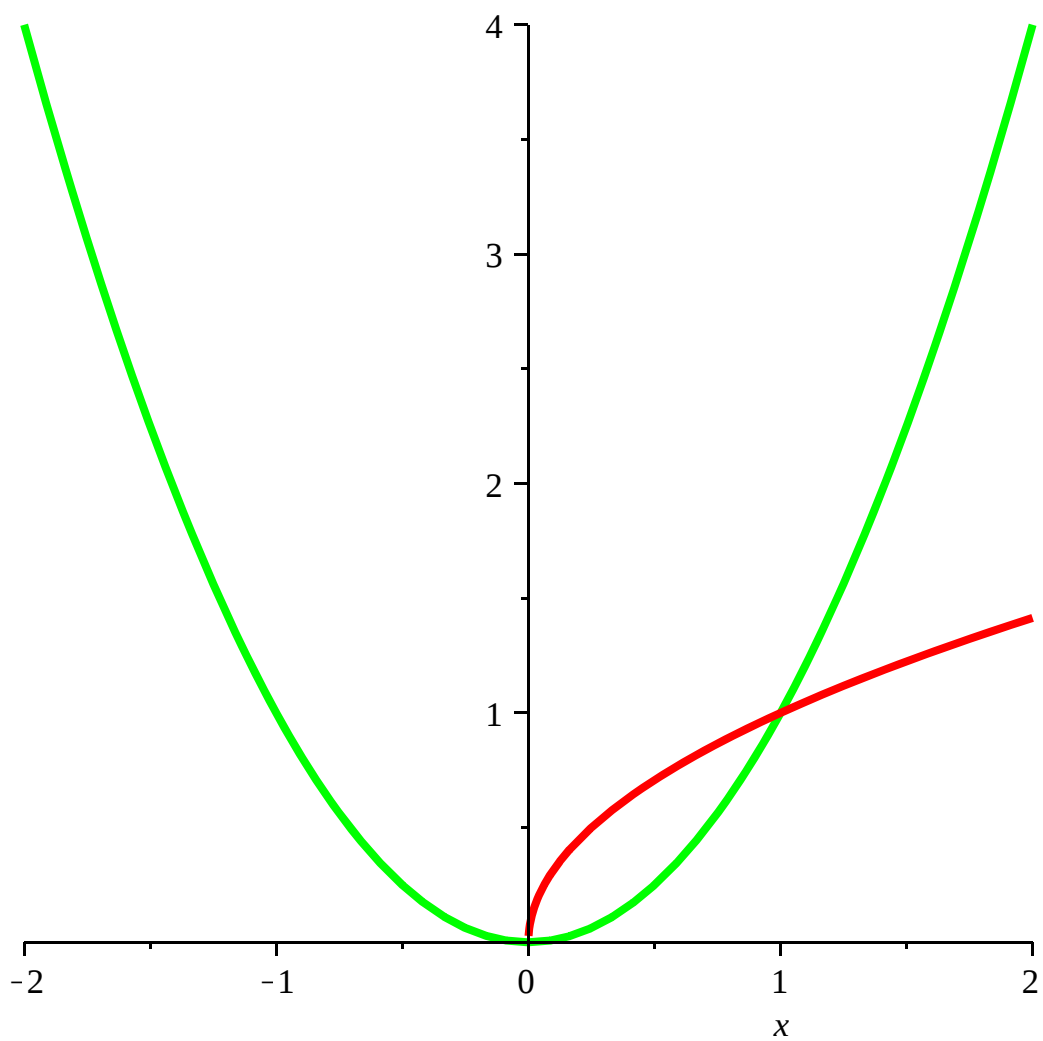
$g := x \rightarrow \sqrt{x}$

```
> plot(g(x), x=-2..2, thickness=3);
```

(1.4)



```
> Gf := plot( f(x), x=-2..2, color = green, thickness = 3 ) :  
> Gg := plot(g(x), x=-2..2, thickness = 3 ) :  
> display(Gf, Gg);
```



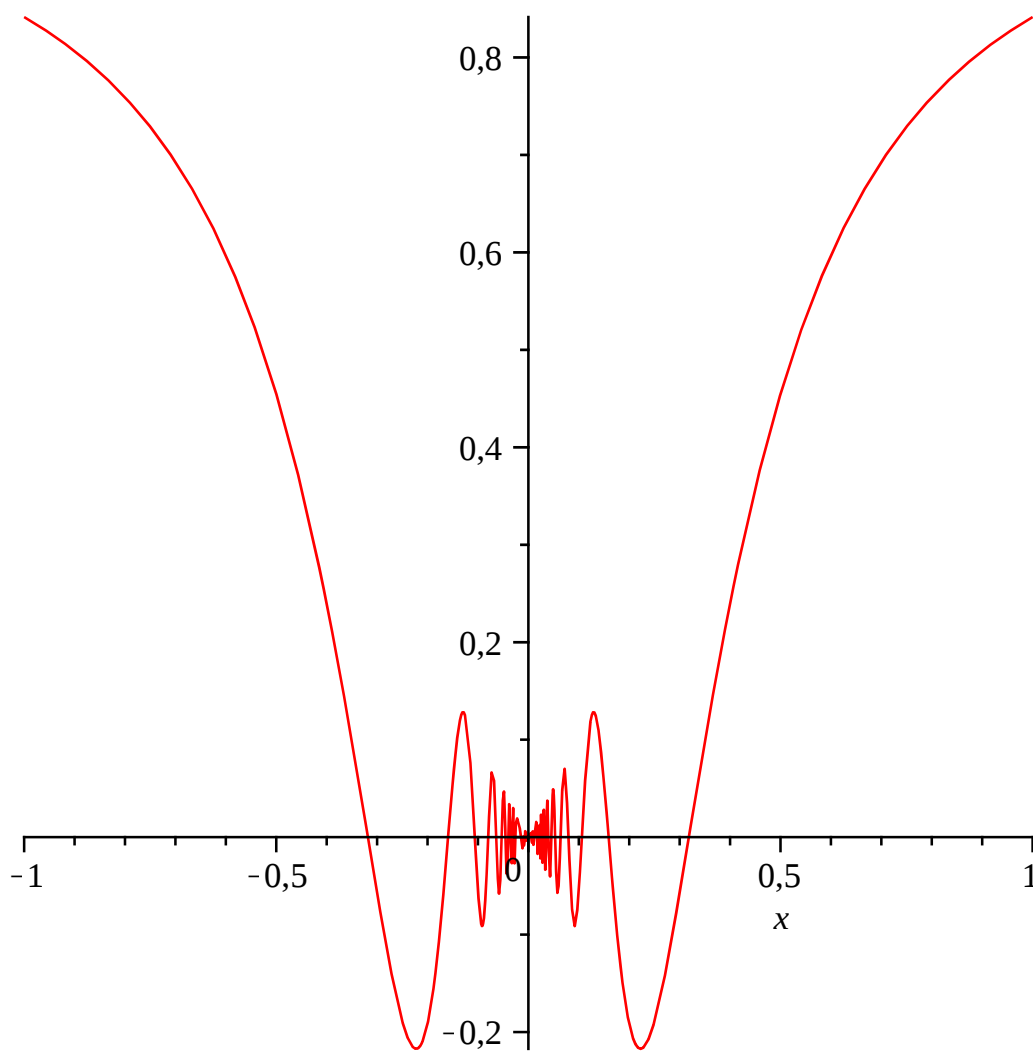
```
> h := x→x·sin(1/x);
```

$$h := x \rightarrow x \sin\left(\frac{1}{x}\right) \quad (1.5)$$

```
> h(x);
```

$$x \sin\left(\frac{1}{x}\right) \quad (1.6)$$

```
> plot(h(x), x=-1..1);
```



```
> limit(h(x), x=0);
```

0

(1.7)

```
> limx→0 h(x);
```

0

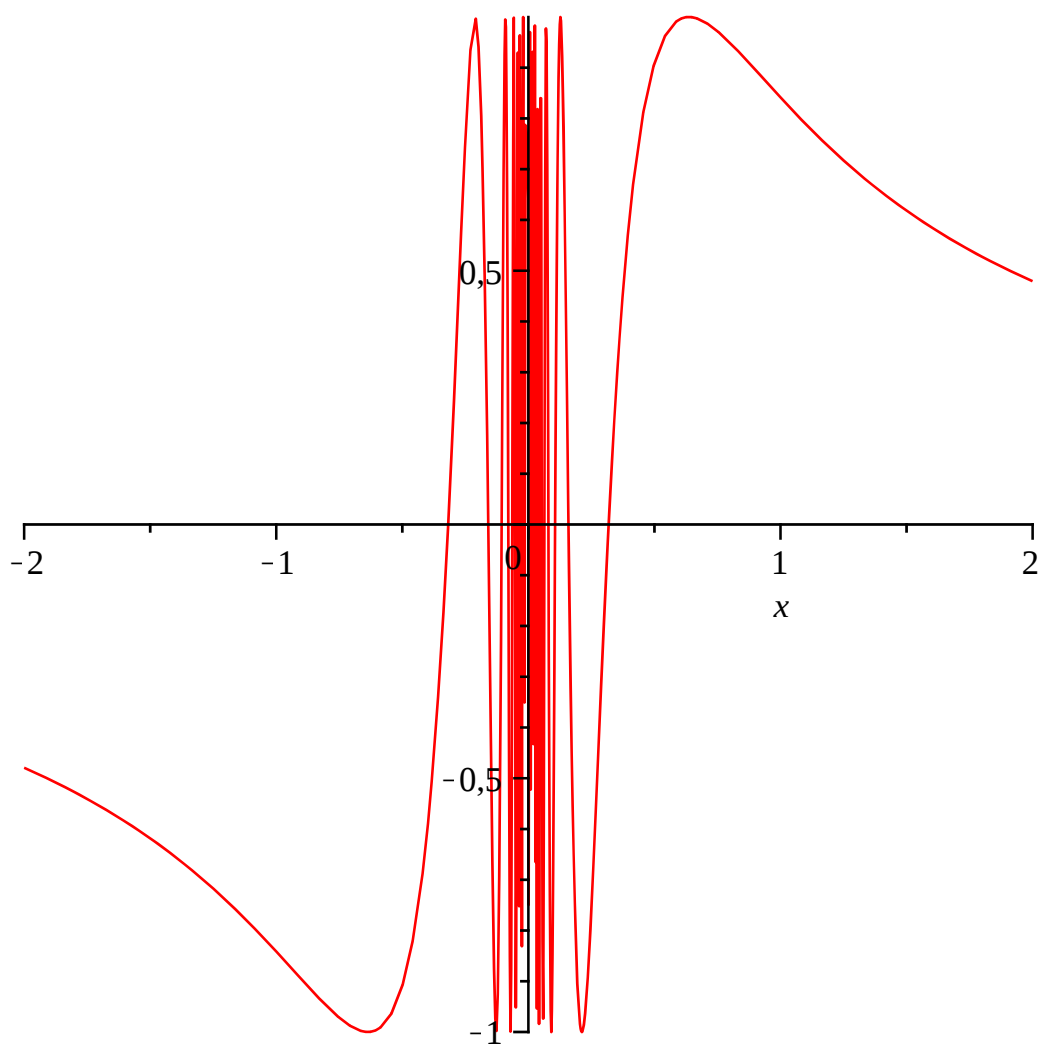
(1.8)

```
> f1 := x→sin(1/x);
```

$f1 := x \rightarrow \sin\left(\frac{1}{x}\right)$

(1.9)

```
> plot(f1(x), x=-2..2);
```



```
> limit( f1(x), x=0);
```

```
-1..1
```

(1.10)

```
> limit( 1/x, x=0 );
```

```
undefined
```

(1.11)

▼ Funciones de varias variables

```
[> restart : with(plots) :
```

▼ Ejemplo 1

```
> f := (x,y) → x2 + y2;
```

```
f := (x,y) → x2 + y2
```

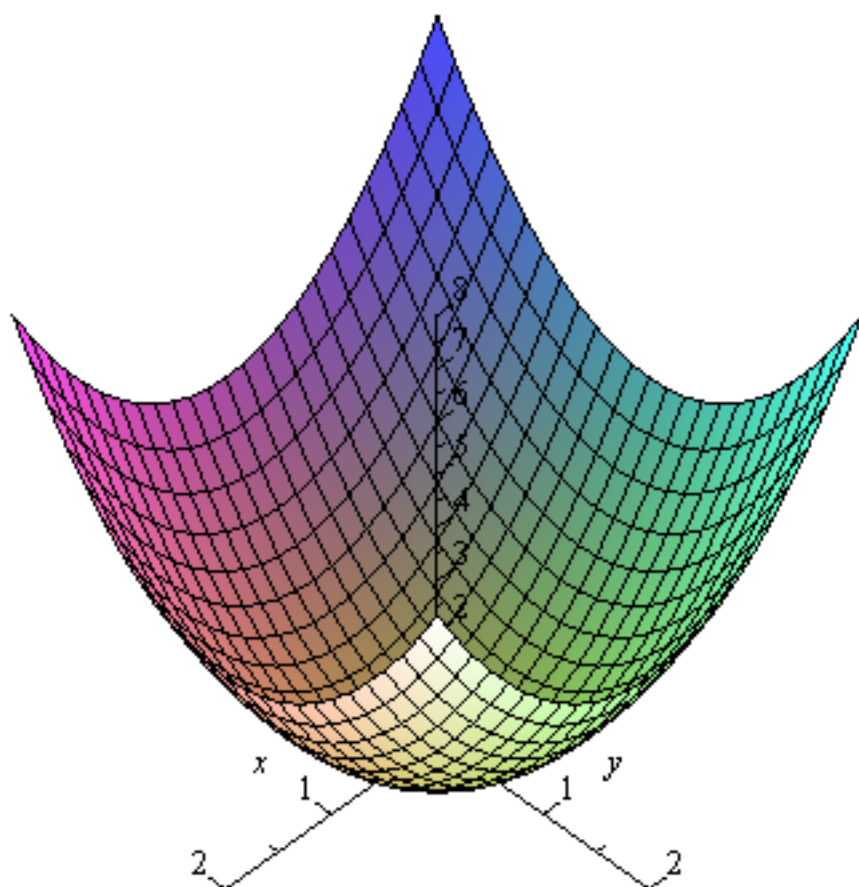
(2.1.1)

```
> f(1,2);
```

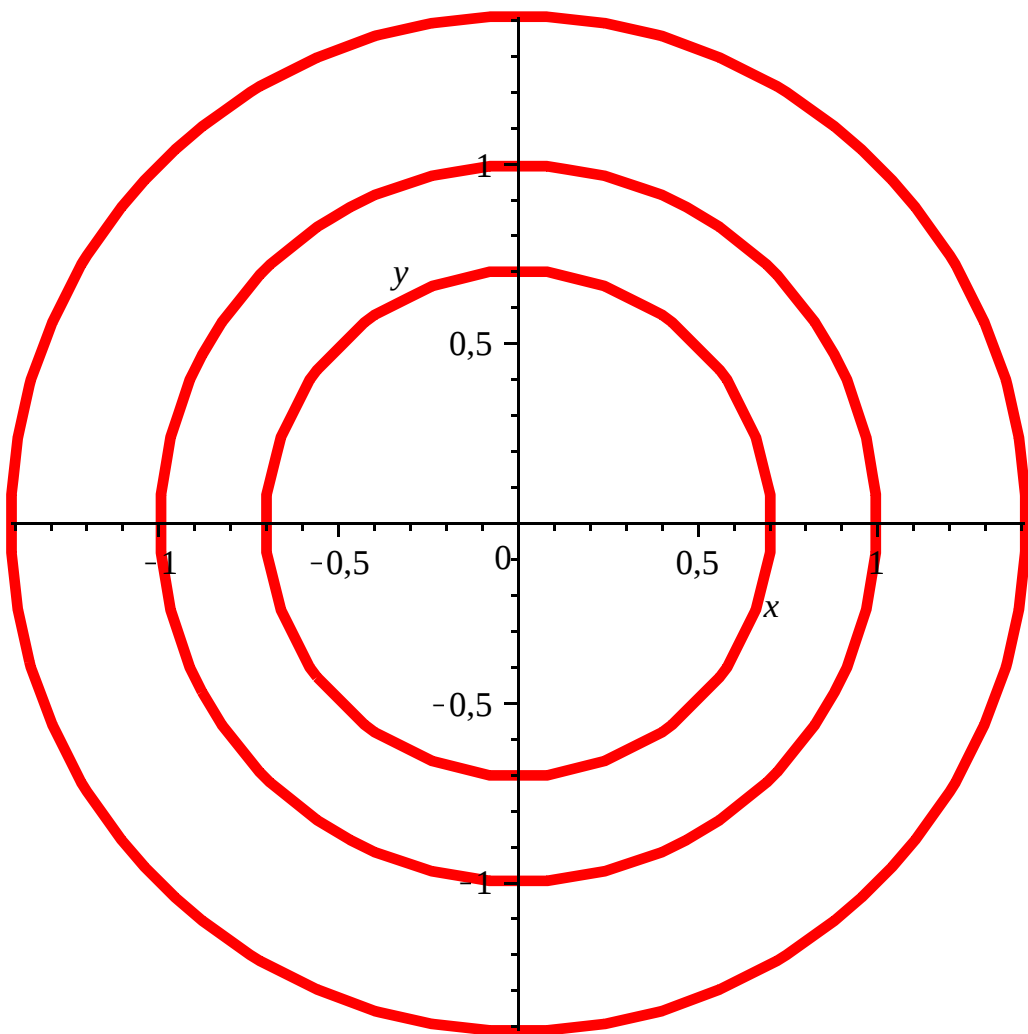
```
5
```

(2.1.2)

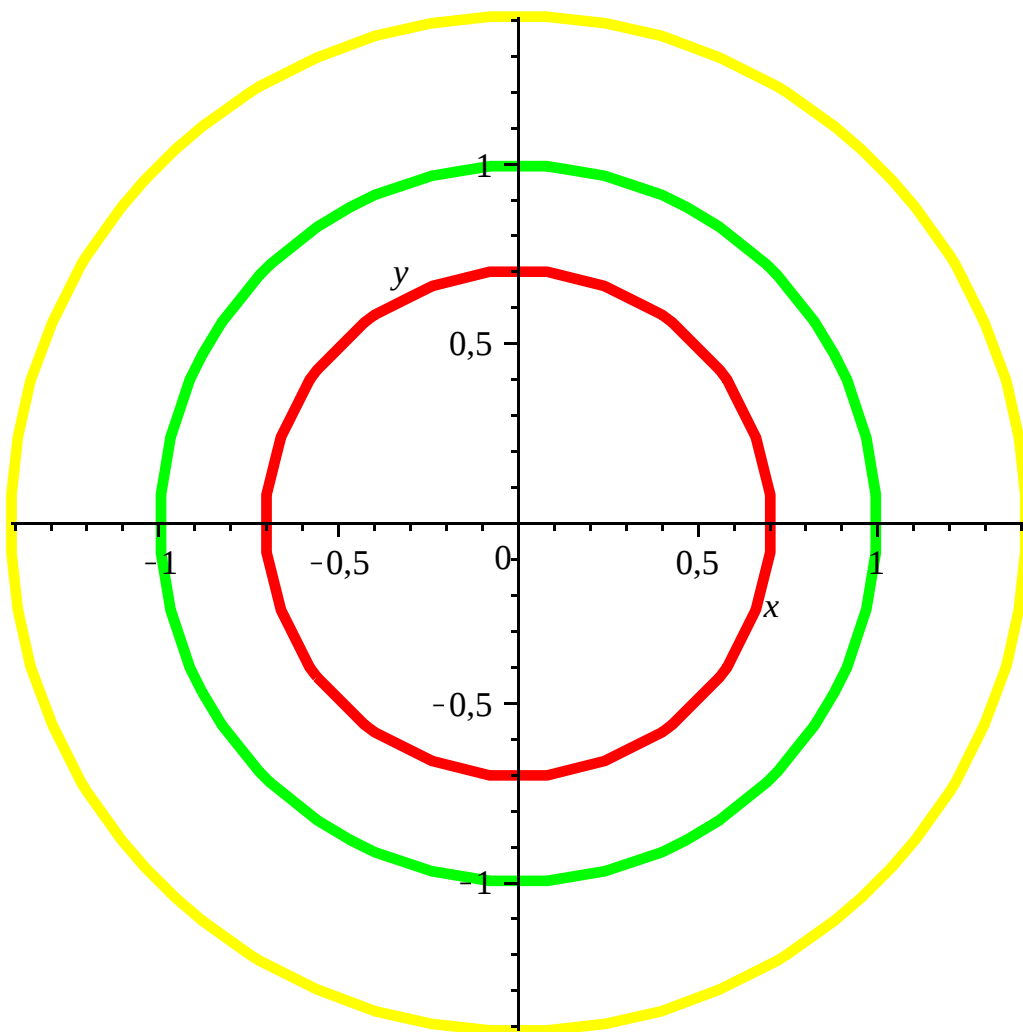
```
> plot3d( f(x,y), x=-2..2, y=-2..2, axes = normal);
```



> `implicitplot` $\left(\left\{f(x, y) = \frac{1}{2}, f(x, y) = 1, f(x, y) = 2\right\}, x = -2 \dots 2, y = -2 \dots 2, thickness = 4\right);$



```
> implicitplot([ f(x,y) = 1/2, f(x,y) = 1, f(x,y) = 2 ], x=-2..2, y=-2..2, thickness=4,
               color=[red, green, yellow]);
```



```
> for k from 1 to 8 do
  f(x, y) = k;
od;
```

$$x^2 + y^2 = 1$$

$$x^2 + y^2 = 2$$

$$x^2 + y^2 = 3$$

$$x^2 + y^2 = 4$$

$$x^2 + y^2 = 5$$

$$x^2 + y^2 = 6$$

$$x^2 + y^2 = 7$$

$$x^2 + y^2 = 8$$

(2.1.3)

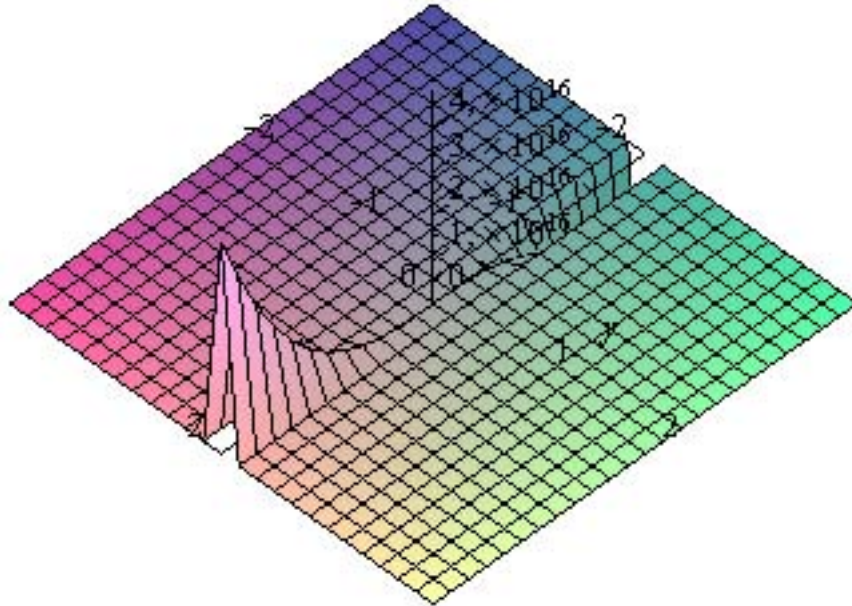
▼ Ejemplo 2

```
> f1 := (x, y) -> x^3 / y;
```

$$f1 := (x, y) \rightarrow \frac{x^3}{y}$$

(2.2.1)

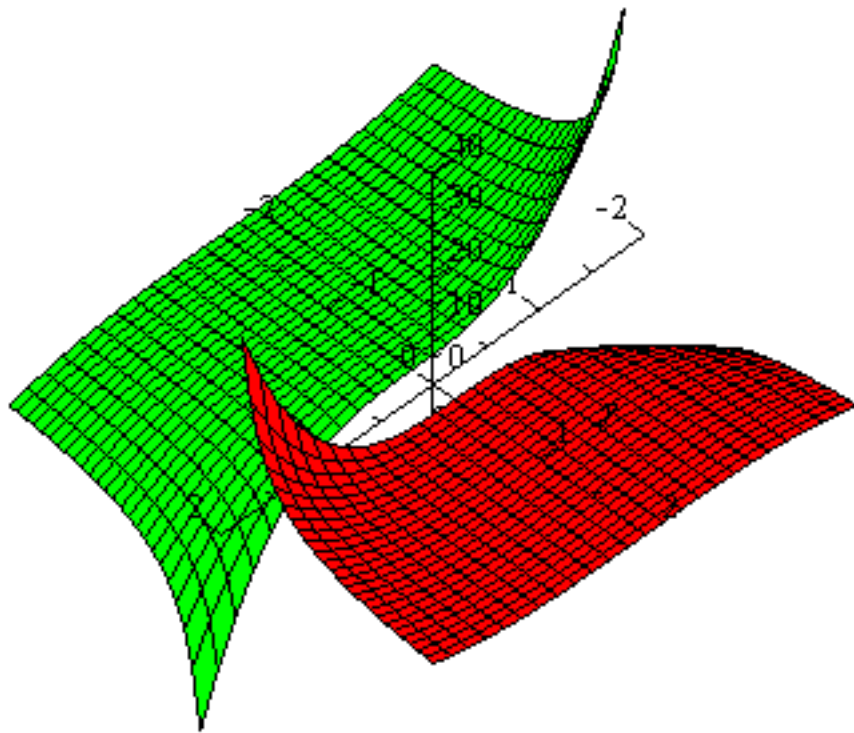
```
> plot3d( f1(x, y), x=-2..2, y=-2..2, axes = normal);
```



```
> Gf1r := plot3d( f1(x, y), x=-2..2, y=0.2..2, axes = normal, color = red) :
```

```
> Gf1a := plot3d( f1(x, y), x=-2..2, y=-2..-0.2, axes = normal, color = green) :
```

```
> display( Gf1r, Gf1a);
```



```
> for k from 1 to 3 do
  f1(x, y) = k;
od;
```

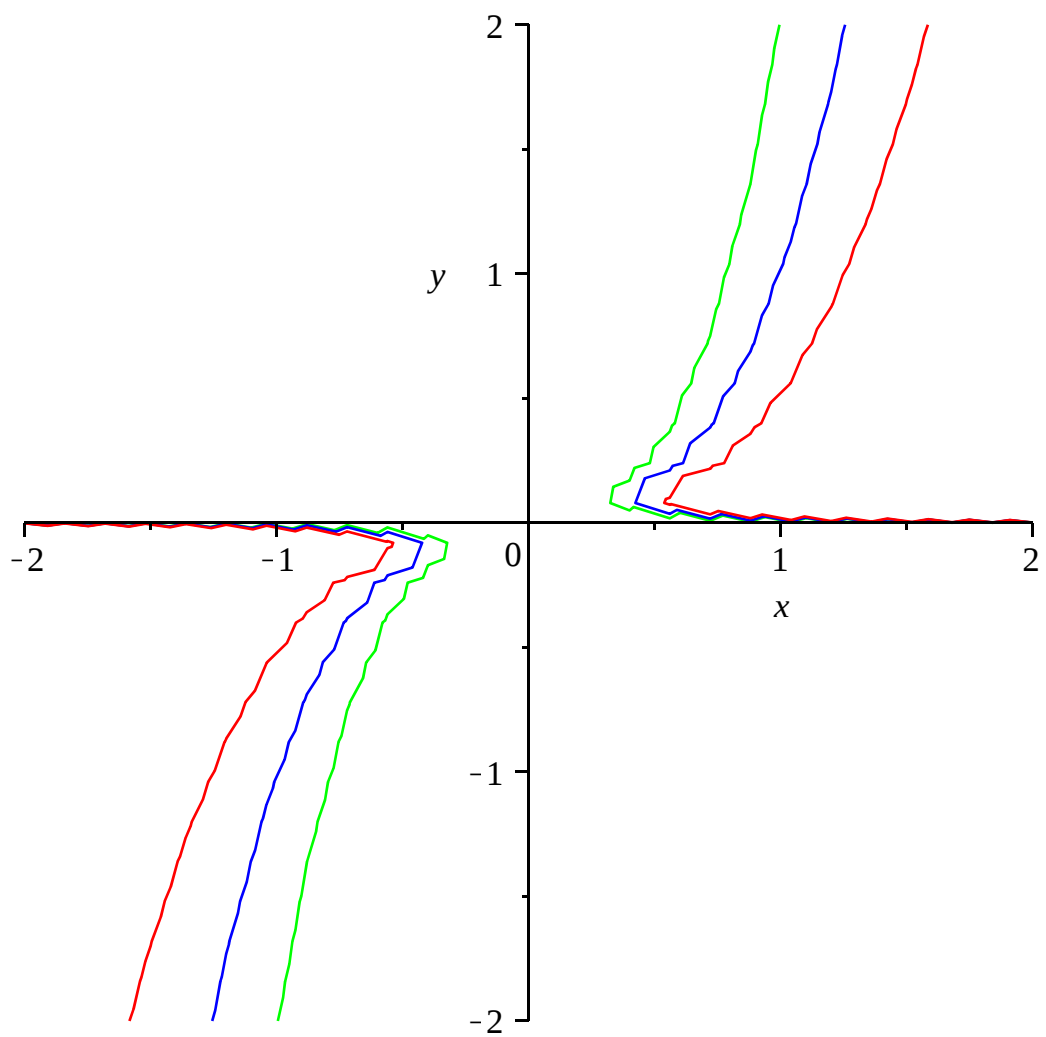
$$\frac{x^3}{y} = 1$$

$$\frac{x^3}{y} = 2$$

$$\frac{x^3}{y} = 3$$

(2.2.2)

```
> implicitplot( [ f1(x, y) = 0.5, f1(x, y) = 1, f1(x, y) = 2 ], x = -2 .. 2, y = -2 .. 2, color
  = [green, blue, red]);
```



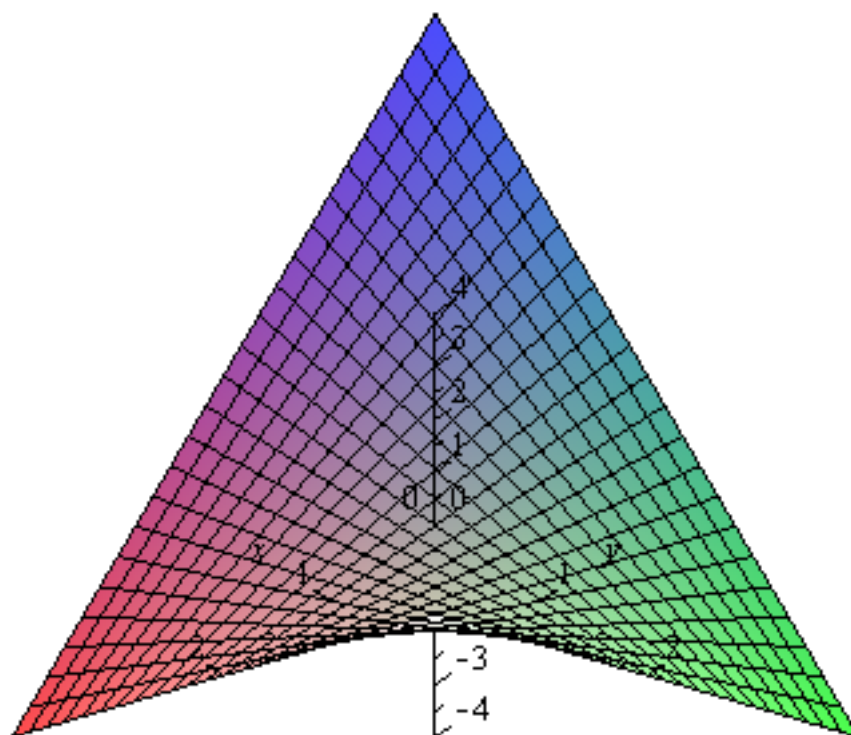
▼ Ejemplo 3

> $f2 := (x, y) \rightarrow x \cdot y;$

$f2 := (x, y) \rightarrow x \cdot y$

(2.3.1)

> $\text{plot3d}(f2(x, y), x = -2 \dots 2, y = -2 \dots 2, \text{axes} = \text{normal});$



```

> {seq( f2(x, y) = k, k = 1 ..8 ) };
    {xy = 1, xy = 2, xy = 3, xy = 4, xy = 5, xy = 6, xy = 7, xy = 8}
> D1 := implicitplot( { f2(x, y) = 1, f2(x, y) = 2 }, x = -2 ..2, y = -2 ..2 ) :
> D2 := implicitplot( { f2(x, y) = -1, f2(x, y) = -2 }, x = -2 ..2, y = -2 ..2, color = green ) :
> display(D1, D2);

```

(2.3.2)

[>

