

Cambiamento di scala, traslazioni e simmetrie

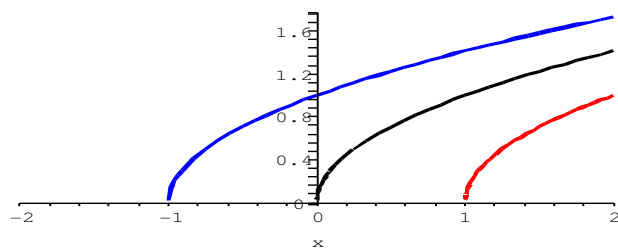
Traslazioni

```
> restart:
> f1:=x->sqrt(x);f2:=x->sqrt(x-1);f3:=x->sqrt(x+1);

$$f1 := x \mapsto \sqrt{x}$$

$$f2 := x \mapsto \sqrt{x-1}$$

$$f3 := x \mapsto \sqrt{x+1}$$
> plot([f1(x),f2(x),f3(x)],x=-2..2,color=[black,red,blue],thickness=2);
```

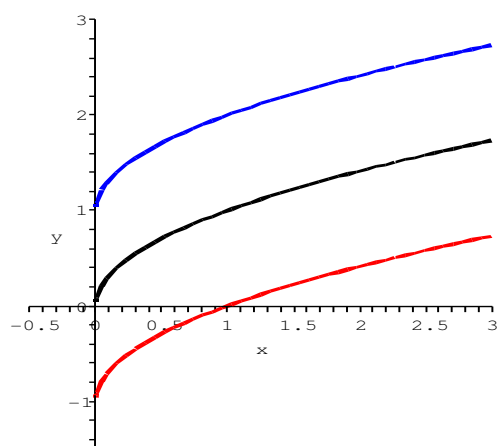


```
> restart:
> f1:=x->sqrt(x);f2:=x->sqrt(x)-1;f3:=x->sqrt(x)+1;

$$f1 := x \mapsto \sqrt{x}$$

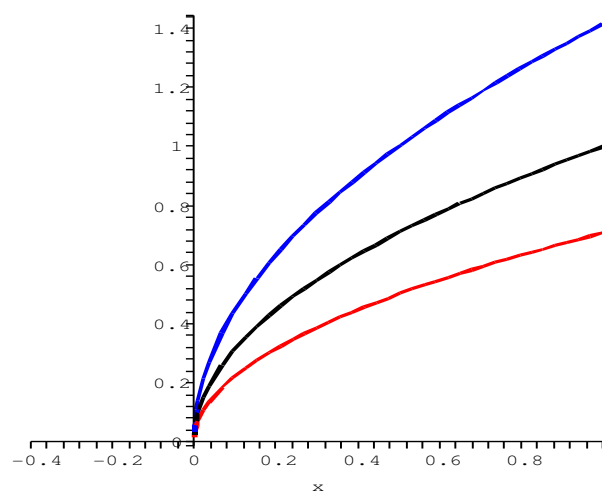
$$f2 := x \mapsto \sqrt{x} - 1$$

$$f3 := x \mapsto \sqrt{x} + 1$$
> plot([f1(x),f2(x),f3(x)],x=-0.5..3,y=-1.5..3,color=[black,red,blue],thickness=2);
```



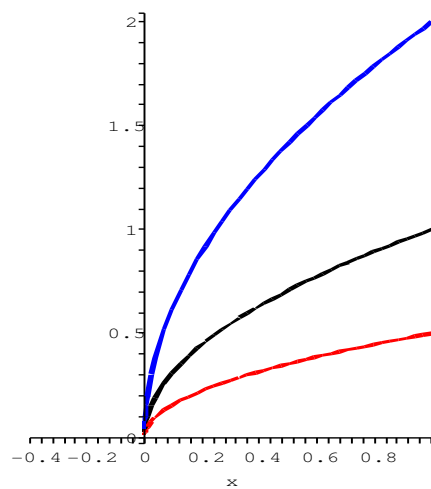
Cambiamento di scala sull'asse x

```
> plot([f1(x),f1(x/2),f1(2*x)],x=-0.4..1,scaling=constrained,color=[black,red,blue],thi
```

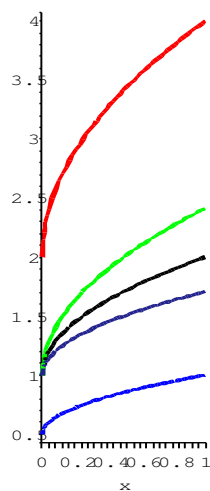


Cambiamento di scala sull'asse y

```
> plot([f1(x),f1(x)/2,2*f1(x)],x=-0.4..1,scaling=constrained,color=[black,red,blue],thi
```



```
> plot([f3(x),2*f3(x),f3(x)/2,f3(2*x),f3(x/2)],x=0..1,scaling=constrained,color=[black,red,blue,black,blue],
```



Simmetria rispetto agli assi x e y

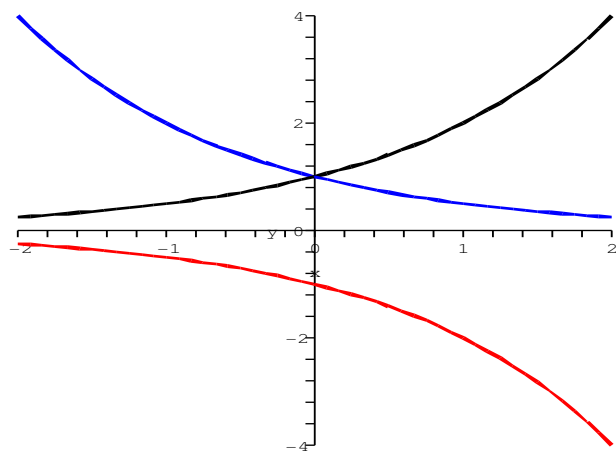
```
> restart:
> f:=x->2^x;g:=x->-2^x;h:=x->2^(-x);
```

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

$$g := x \mapsto -2^x$$

$$h := x \mapsto 2^{-x}$$

```
> plot([2^(x), -2^(x), 2^(-x)], x=-2..2, y=-4..4, color=[black, red, blue], thickness=2);
```



Come opera il valore assoluto

```
> restart;
```

```
> abs(x), abs(-3), abs(3);
```

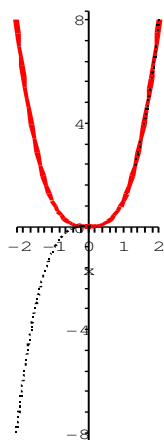
$|x|$, 3, 3

```
> f:=x->x^3; g:=x->abs(x^3);
```

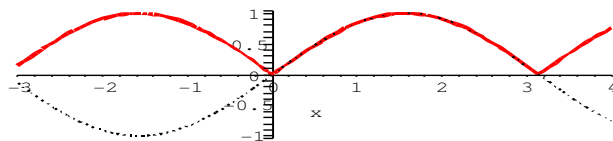
$f := x \mapsto x^3$

$g := x \mapsto (|x|)^3$

```
> plot([f(x), g(x)], x=-2..2, linestyle=[4, 1], color=[black, red], thickness=[1, 2]);
```



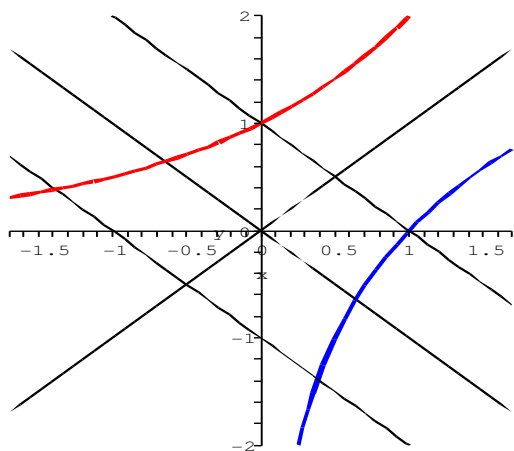
```
> restart;
> f:=x->sin(x);g:=x->abs(sin(x));
       $f := x \mapsto \sin(x)$ 
       $g := x \mapsto |\sin(x)|$ 
> plot([f(x),g(x)],x=-3..4,scaling=constrained,linestyle=[4,1],color=[black,red],thickn
```



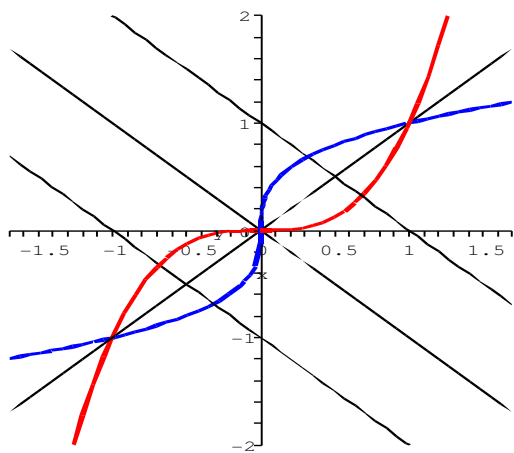
Simmetria rispetto alla retta $x=y$.

Coincide con lo scambio delle x con la y nel grafico $y=f(x)$

```
> restart:
> plot([x,-x,-x+1,-x-1, 2^(x),log[2](x)],x=-1.69..1.69,y=-2..2,scaling=constrained,color=
```



```
> restart:
> plot([x,-x,-x+1,-x-1, x^3,surd(x,3)],x=-1.69..1.69,y=-2..2,scaling=constrained,color=
```



```
> restart:
> f:=x->2*x/(x-1);g:=x->x/(x-2);
```

$$f := x \mapsto 2 \frac{x}{x-1}$$

$$g := x \mapsto \frac{x}{x-2}$$

> $y=2*x/(x-1); x=2*y/(y-1);$

$$y = 2 \frac{x}{x-1}$$

$$x = 2 \frac{y}{y-1}$$

> $\text{solve}(x=2*y/(y-1), y);$

$$\frac{x}{x-2}$$

> $\text{plot}([x, -x, -x+6, -x-1.5, -x+7.3, f(x), g(x)], x=-3..7, y=-5..5, \text{color}=[\text{black}, \text{black}, \text{black}, \text{black}, \text{black}, \text{black}, \text{black}]);$

