

### Costruzione di grafici

Consideriamo la seguente funzione

```
> restart;
```

```
> h:=x->x/(1-x);
```

$$h := x \mapsto \frac{x}{1-x}$$

```
> h(x)=-1/(x-1)-1;
```

$$\frac{x}{1-x} = -(x-1)^{-1} - 1$$

Partendo dal grafico di  $x^{-1}$  si consideri la traslazione in direzione dell'asse x, ottenendo  $(x-1)^{-1}$ , poi la simmetria rispetto all'asse x, ottenendo  $-(x-1)^{-1} = (1-x)^{-1}$ . Infine si consideri la traslazione in direzione dell'asse y e quindi il grafico di h

```
> a1:=plot(1/x,x=-2..2,y=-5..5,linestyle=4,color=red,thickness=1,discont=true):
```

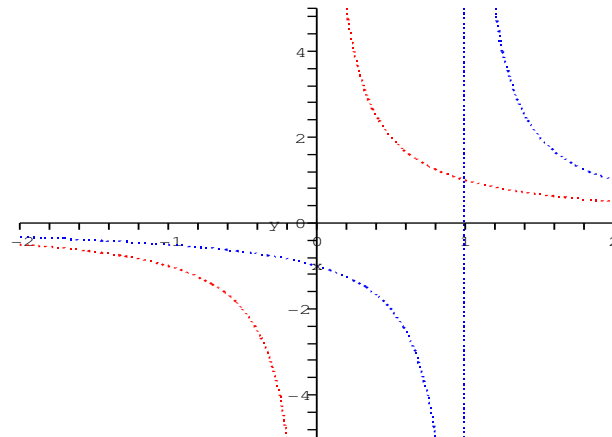
```
> a2:=plot(1/(x-1),x=-2..2,y=-5..5,linestyle=4,color=blue,thickness=1):
```

```
> a3:=plot(-1/(x-1),x=-2..2,y=-5..5,linestyle=1,color=green,thickness=1,discont=true):
```

```
> a4:=plot(-1/(x-1)-1,x=-2..2,y=-5..5,linestyle=1,color=black,thickness=2,discont=true)
```

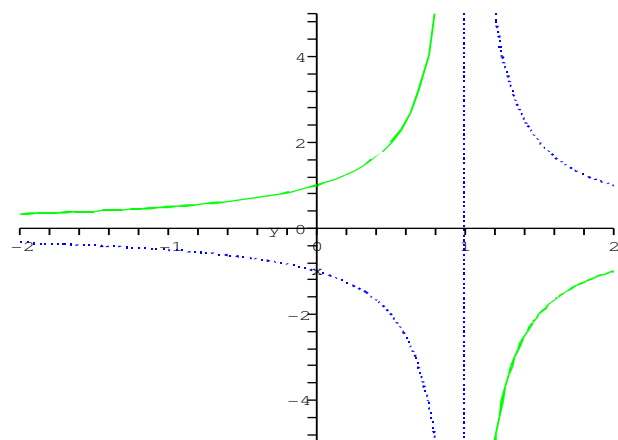
Disegniamo la funzione  $x^{-1}$  e la sua traslazione  $(x-1)^{-1}$

```
> plots[display](a1,a2);
```



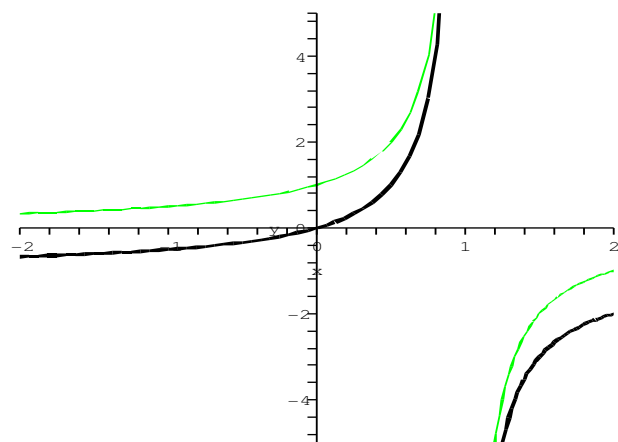
Disegniamo  $(x-1)^{-1}$  e la sua simmetrica  $-(x-1)^{-1}$

```
> plots[display](a2,a3);
```

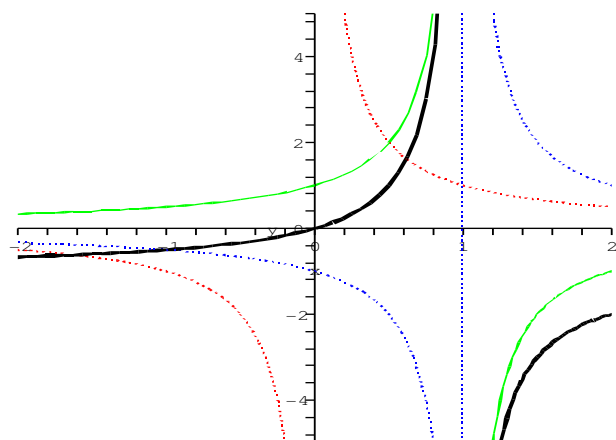


Disegniamo  $-(x-1)^{-1}$  e la sua traslata  $-(x-1)^{-1} - 1$

```
> plots[display](a3,a4);
```



```
> plots[display](a1,a2,a3,a4);
```



Per disegnare la funzione  $x \mapsto -\sqrt{1-x} + 1$  consideriamo le seguenti funzioni

```
> f1:=x->sqrt(x);f2:=x->sqrt(1+x);f3:=x->sqrt(1-x);f4:=x->-sqrt(1-x);f5:=x->-sqrt(1-x)+1;
```

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

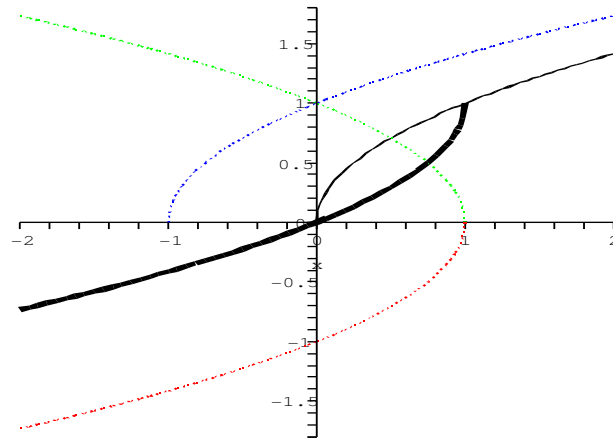
$$f2 := x \mapsto \sqrt{1+x}$$

$$f3 := x \mapsto \sqrt{1-x}$$

$$f4 := x \mapsto -\sqrt{1-x}$$

$$f5 := x \mapsto -\sqrt{1-x} + 1$$

```
> b1:=plot(f1(x),x=0..2,linestyle=1,color=black,thickness=1):
> b2:=plot(f2(x),x=-1..2,linestyle=4,color=blue,thickness=1):
> b3:=plot(f3(x),x=-2..1,linestyle=4,color=green,thickness=1):
> b4:=plot(f4(x),x=-2..1,linestyle=4,color=red,thickness=1):
> b5:=plot(f5(x),x=-2..1,linestyle=1,color=black,thickness=3):
> plots[display](b1,b2,b3,b4,b5);
```



Consideriamo le seguenti funzioni

```
> g1:=x->sin(x);g2:=x->sin(abs(x));g3:=x->abs(sin(x));
```

$$g1 := x \mapsto \sin(x)$$

$$g2 := x \mapsto \sin(|x|)$$

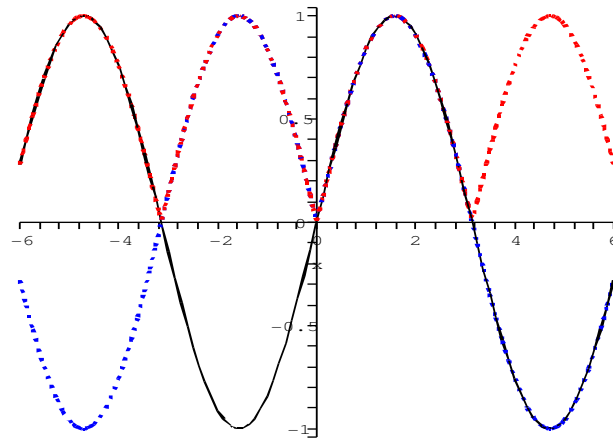
$$g3 := x \mapsto |\sin(x)|$$

```
> c1:=plot(sin(x),x=-6..6,linestyle=1,color=black,thickness=1):
```

```
> c2:=plot(sin(abs(x)),x=-6..6,linestyle=4,color=blue,thickness=2):
```

```
> c3:=plot(abs(sin(x)),x=-6..6,linestyle=4,color=red,thickness=2):
```

```
> plots[display](c1,c2,c3);
```



Consideriamo le seguenti funzioni

```
> h1:=x->2^(x);h2:=x->2^(abs(x));h3:=x->abs(2^(x));h4:=x->2^x-2;h5:=x->abs(2^x-2);h6:=x->2^(x-2);h7:=x->2^(abs(x-2))


$$h1 := x \mapsto 2^x$$


$$h2 := x \mapsto 2^{|x|}$$


$$h3 := x \mapsto |2^x|$$


$$h4 := x \mapsto 2^x - 2$$

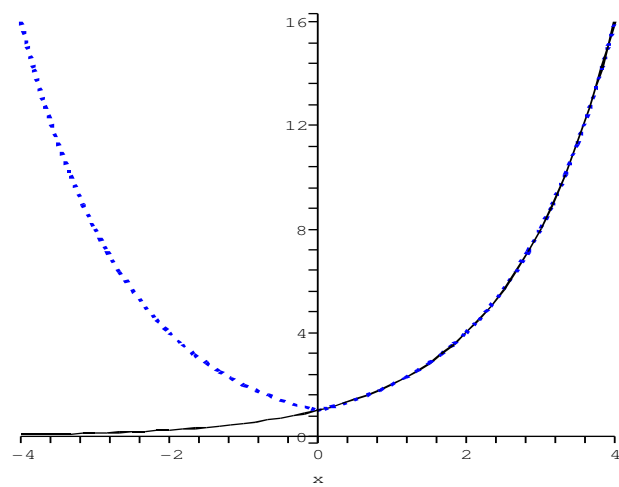

$$h5 := x \mapsto |2^x - 2|$$


$$h6 := x \mapsto 2^{x-2}$$

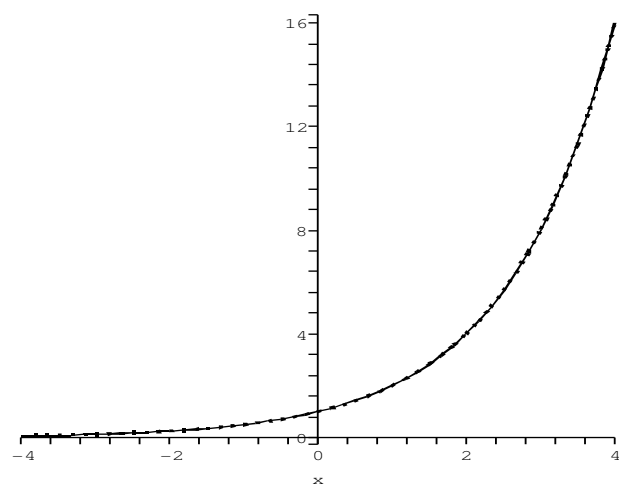

$$h7 := x \mapsto 2^{|x-2|}$$


> d1:=plot(2^(x),x=-4..4,linestyle=1,color=black,thickness=1):
> d2:=plot(2^(abs(x)),x=-4..4,linestyle=4,color=blue,thickness=2):
> d3:=plot(abs(2^(x)),x=-4..4,linestyle=4,color=black,thickness=2):
> d4:=plot(2^x-2,x=-4..4,linestyle=4,color=red,thickness=2):
> d5:=plot(abs(2^x-2),x=-4..4,linestyle=4,color=green,thickness=2):
> d6:=plot(2^(x-2),x=-2..6,linestyle=4,color=red,thickness=2):
> d7:=plot(2^(abs(x-2)),x=-2..6,linestyle=4,color=green,thickness=2):

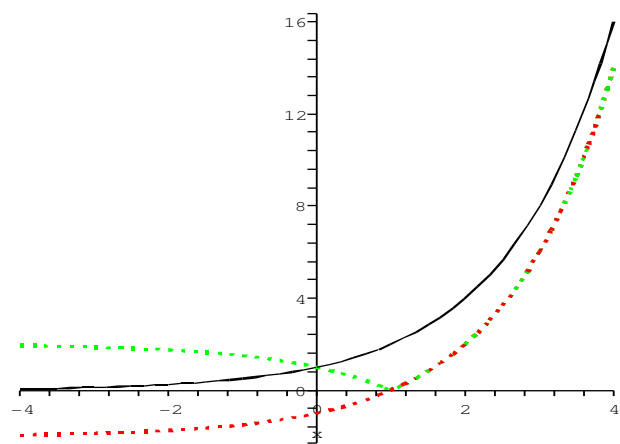
> plots[display](d1,d2);
```



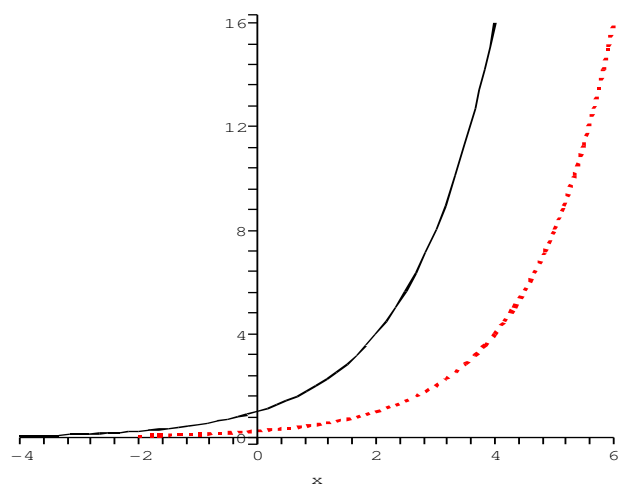
```
> plots[display](d1,d3);
```



```
> plots[display](d1,d4,d5);
```



```
> plots[display](d1,d6);
```



```
> plots[display](d1,d2,d7);
```

