

# I GRAFICI DELLE PRINCIPALI FUNZIONI

## INDICE

### Funzioni algebriche

<u>1.</u> $y = x$	<u>2.</u> $y = -x$	<u>3.</u> $y = x^2$	<u>4.</u> $y = x^3$
<u>5.</u> $y = \frac{1}{x}$	<u>6.</u> $y =  x $	<u>7.</u> $y = \sqrt{x}$	<u>8.</u> $y = \sqrt[3]{x}$
<u>9.</u> $y = k$ (costante)	<u>10.</u> $y = [x]$		

### Funzioni esponenziali e logaritmiche

<u>11.</u> $y = e^x$	<u>12.</u> $y = \left(\frac{1}{2}\right)^x$	<u>13.</u> $y = \ln x$	<u>14.</u> $y = \log_{\frac{1}{2}} x$
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### Funzioni goniometriche

<u>15.</u> $y = \operatorname{sen} x$	<u>16.</u> $y = \operatorname{arcsen} x$	<u>17.</u> $y = \operatorname{cos} x$	<u>18.</u> $y = \operatorname{ar} \operatorname{cos} x$
<u>19.</u> $y = \operatorname{tg} x$	<u>20.</u> $y = \operatorname{arctg} x$		

### 21. Confronto di infiniti

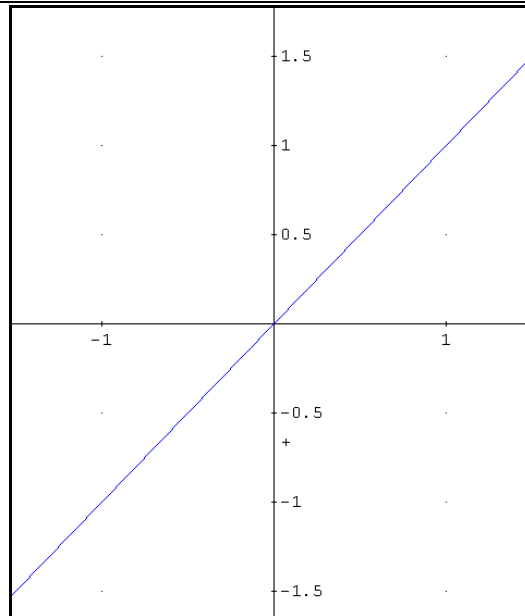
# GRAFICI

## Retta

$$y = x$$

**Dominio:**  $(-\infty; +\infty)$

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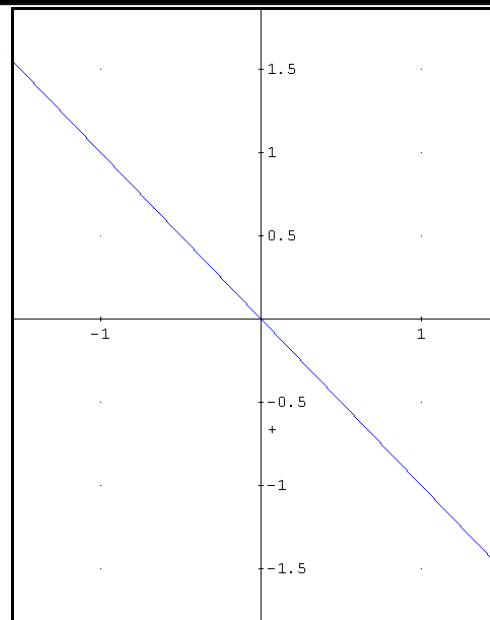


## Retta

$$y = -x$$

**Dominio:**  $(-\infty; +\infty)$

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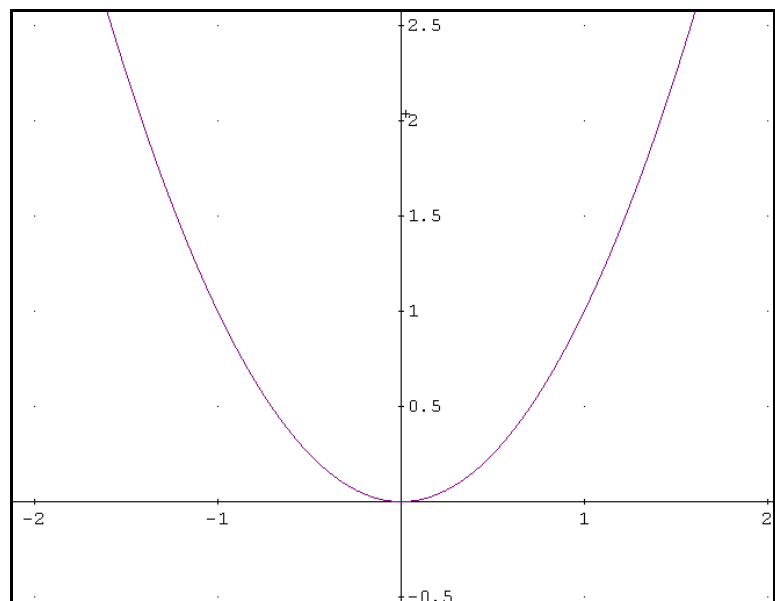


## Parabola

$$y = x^2$$

**Dominio:**  $(-\infty; +\infty)$

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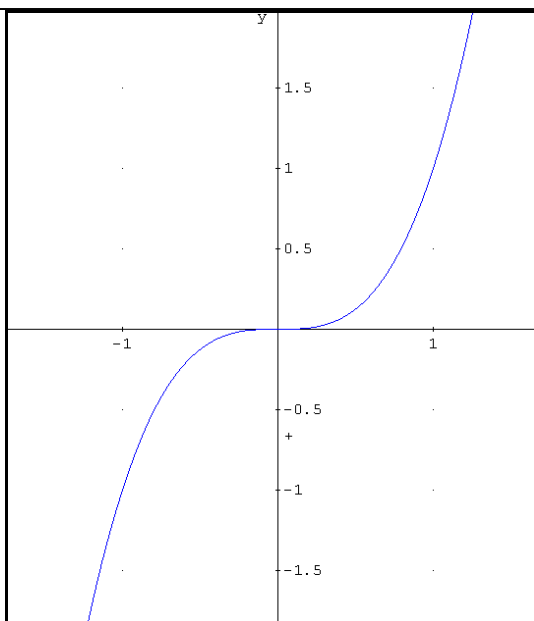


### Cubica

$$y = x^3$$

**Dominio:**  $(-\infty; +\infty)$

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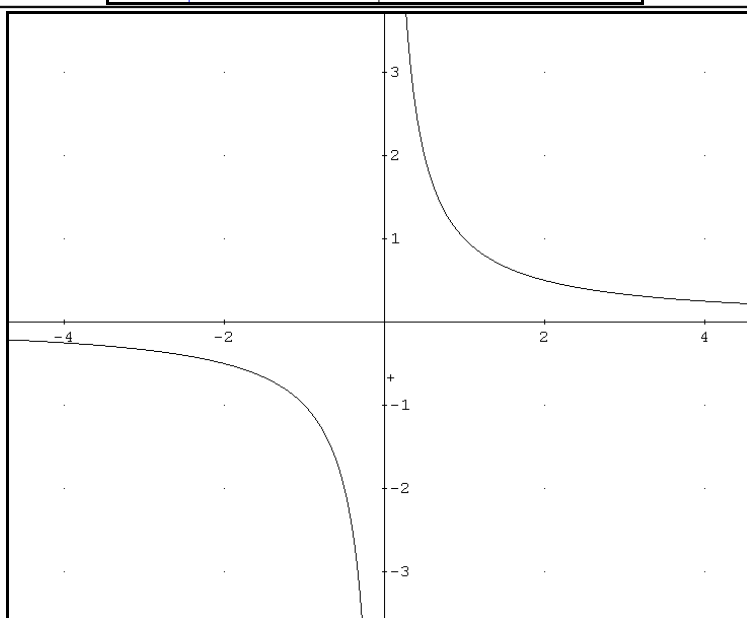


### Iperbole

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

**Dominio:**  $(-\infty; 0) \cup (0; +\infty)$

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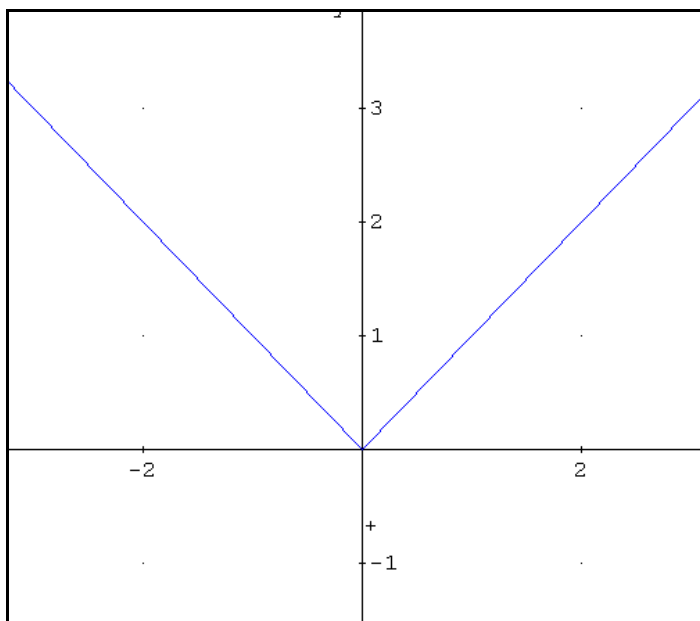


### Modulo di x

$$y = |x|$$

**Dominio:**  $(-\infty; +\infty)$

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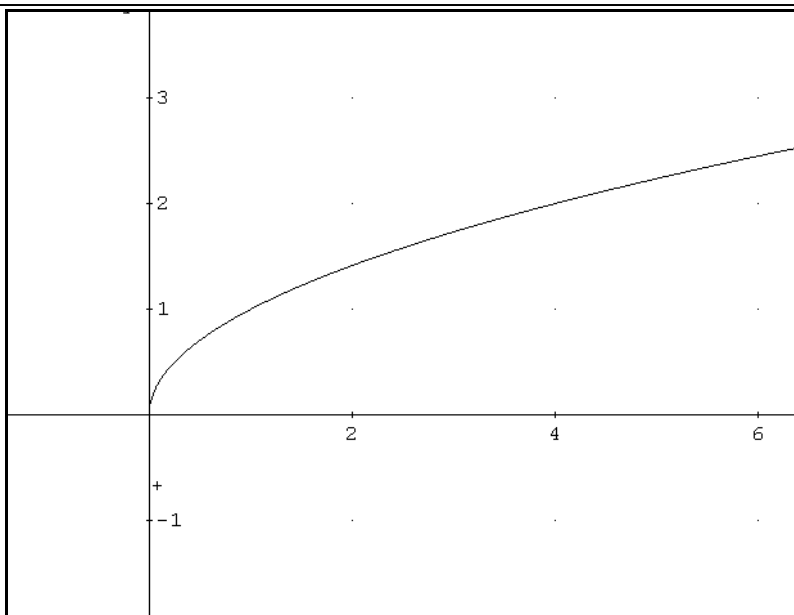


### Radice quadrata di x

$$y = \sqrt{x}$$

**Dominio:**  $[0; +\infty)$

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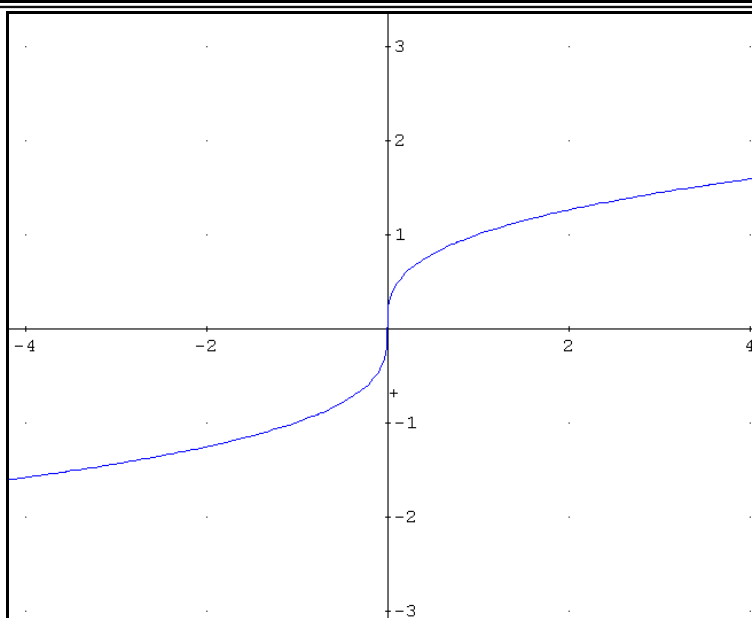


### Radice cubica di x

$$y = \sqrt[3]{x}$$

**Dominio:**  $(-\infty; +\infty)$

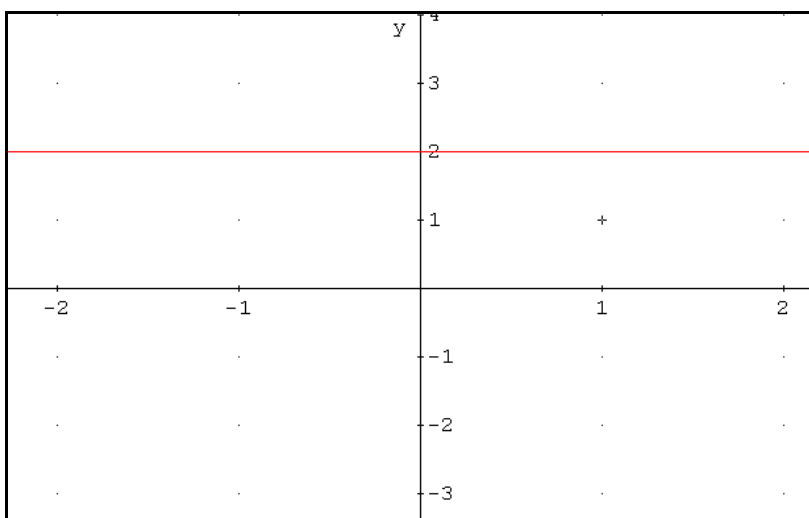
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$$y = k \text{ (costante)}$$

**Dominio:**  $(-\infty; +\infty)$

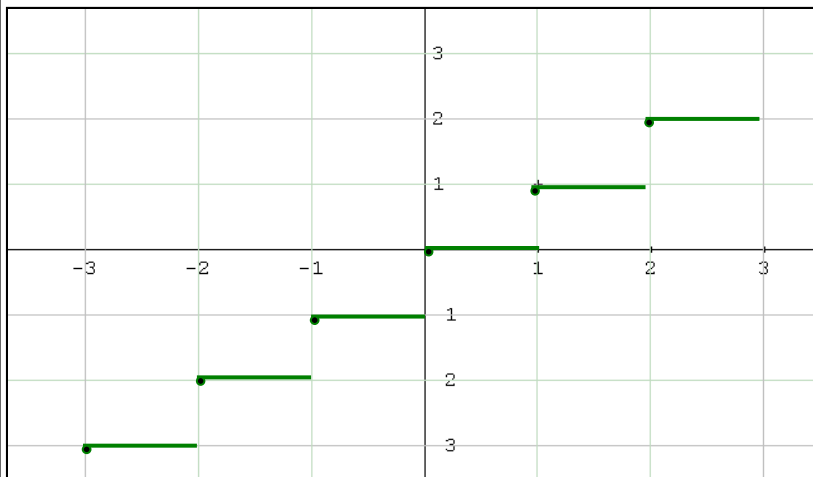
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### Parte intera di x

$$y = [x]$$

**Dominio:**  $(-\infty; +\infty)$

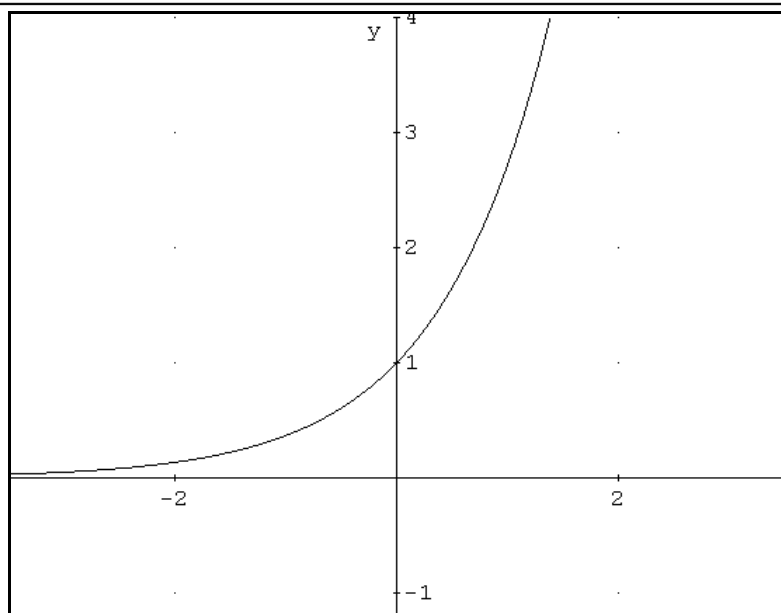


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### Esponenziale con base >1

$$y = e^x$$

**Dominio:**  $(-\infty; +\infty)$

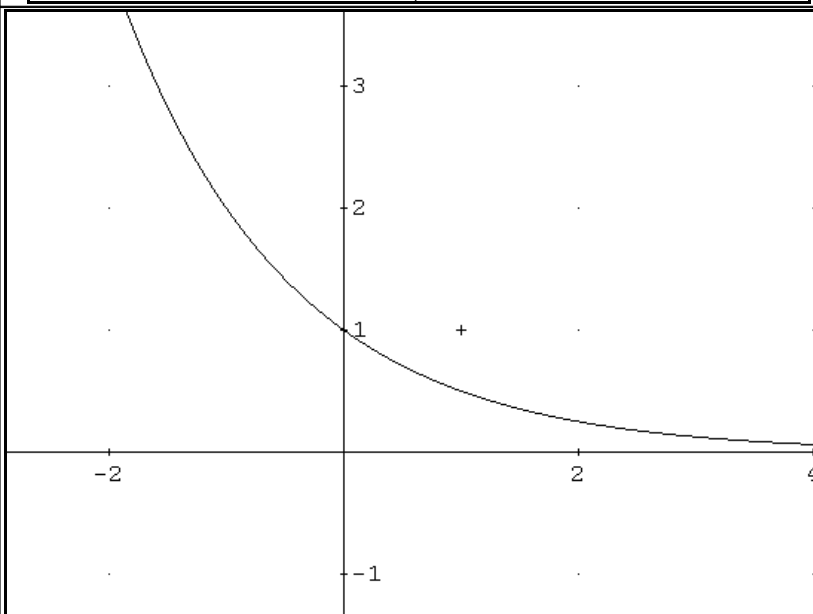


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### Esponenziale con base compresa tra 0 e 1

$$y = \left(\frac{1}{2}\right)^x$$

**Dominio:**  $(-\infty; +\infty)$



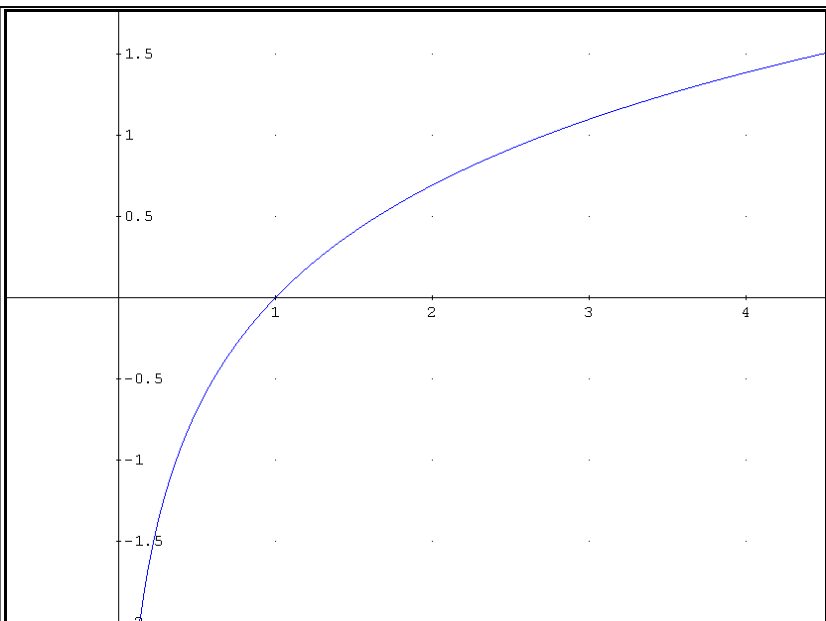
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### Logaritmica con base >1

$$y = \ln x$$

**Dominio:**  $(0 ; + \infty )$

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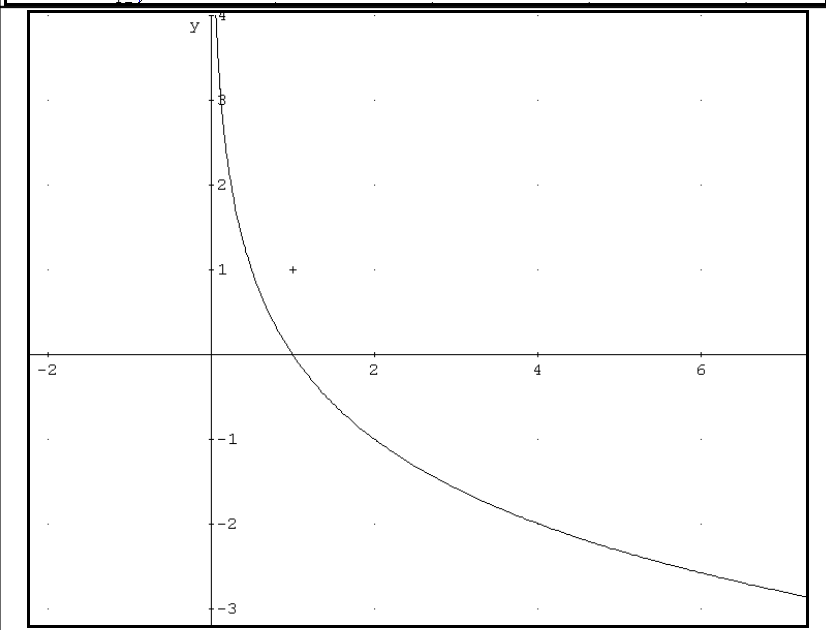


### Logaritmica con base compresa tra 0 e 1

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

**Dominio:**  $(0 ; + \infty )$

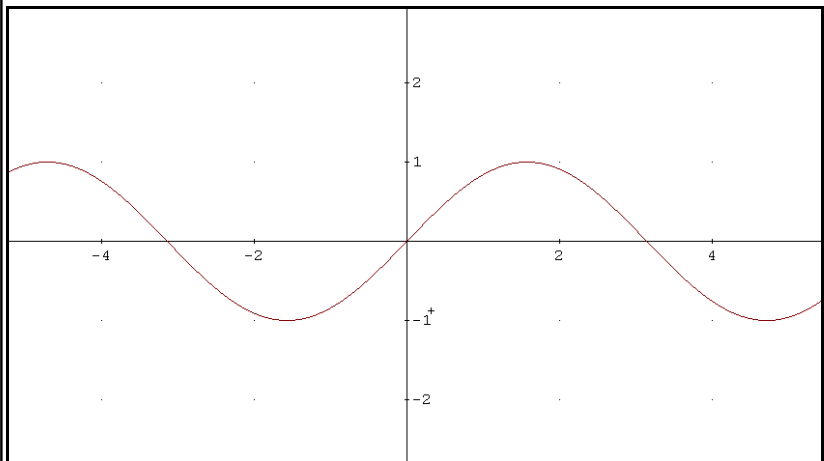
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## Sinusoide

$$y = \text{sen}x$$

**Dominio:**  $(-\infty; +\infty)$

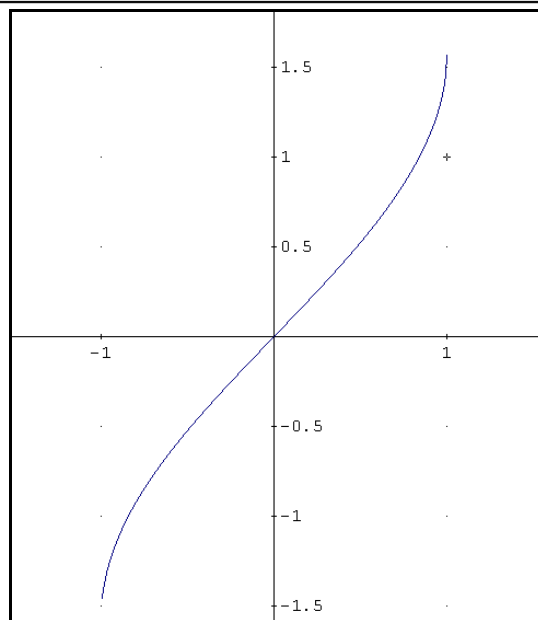


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## Inversa del seno

$$y = \text{arcsen}x$$

**Dominio:**  $[-1; 1]$

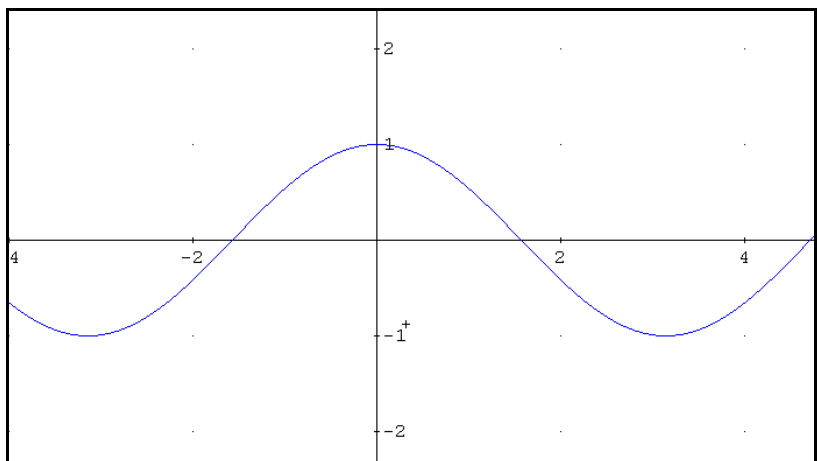


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## Cosinusoide

$$y = \text{cos}x$$

**Dominio:**  $(-\infty; +\infty)$



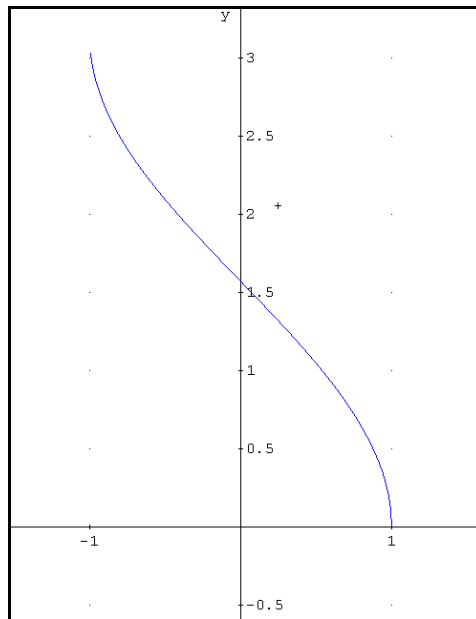
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### Inversa del coseno

$$y = \arccos x$$

**Dominio:**  $[-1; +1]$

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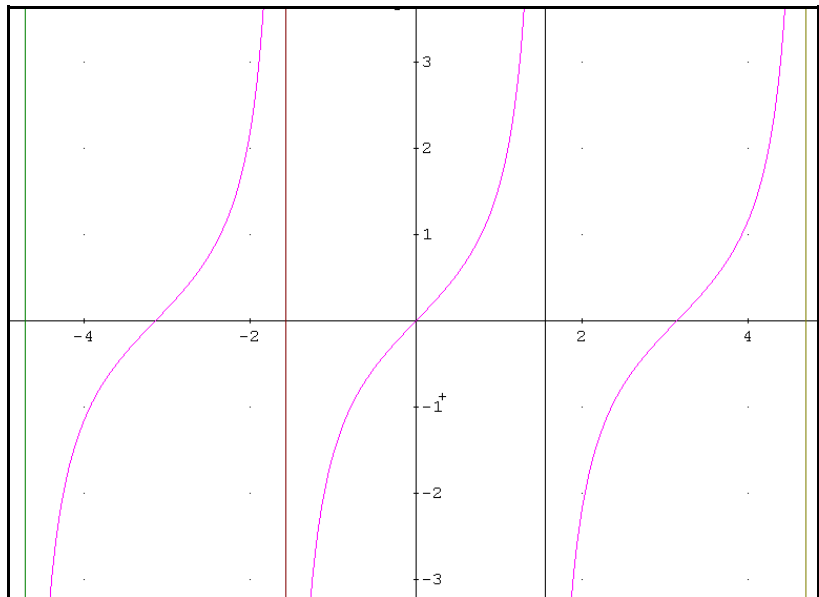
### Tangente

$$y = \operatorname{tg} x$$

**Dominio:**

$(-\infty; +\infty)$  con  $x \neq \frac{\pi}{2} + k\pi$

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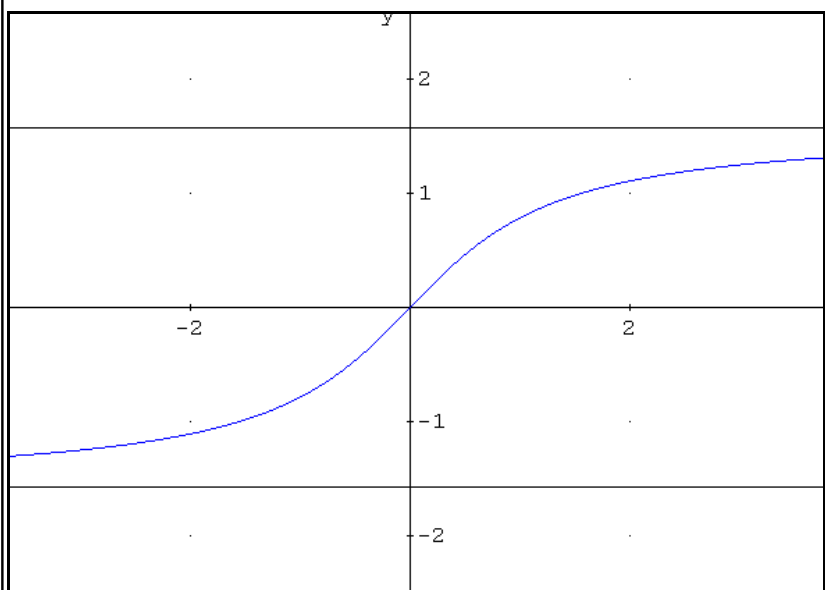


### Inversa della tangente

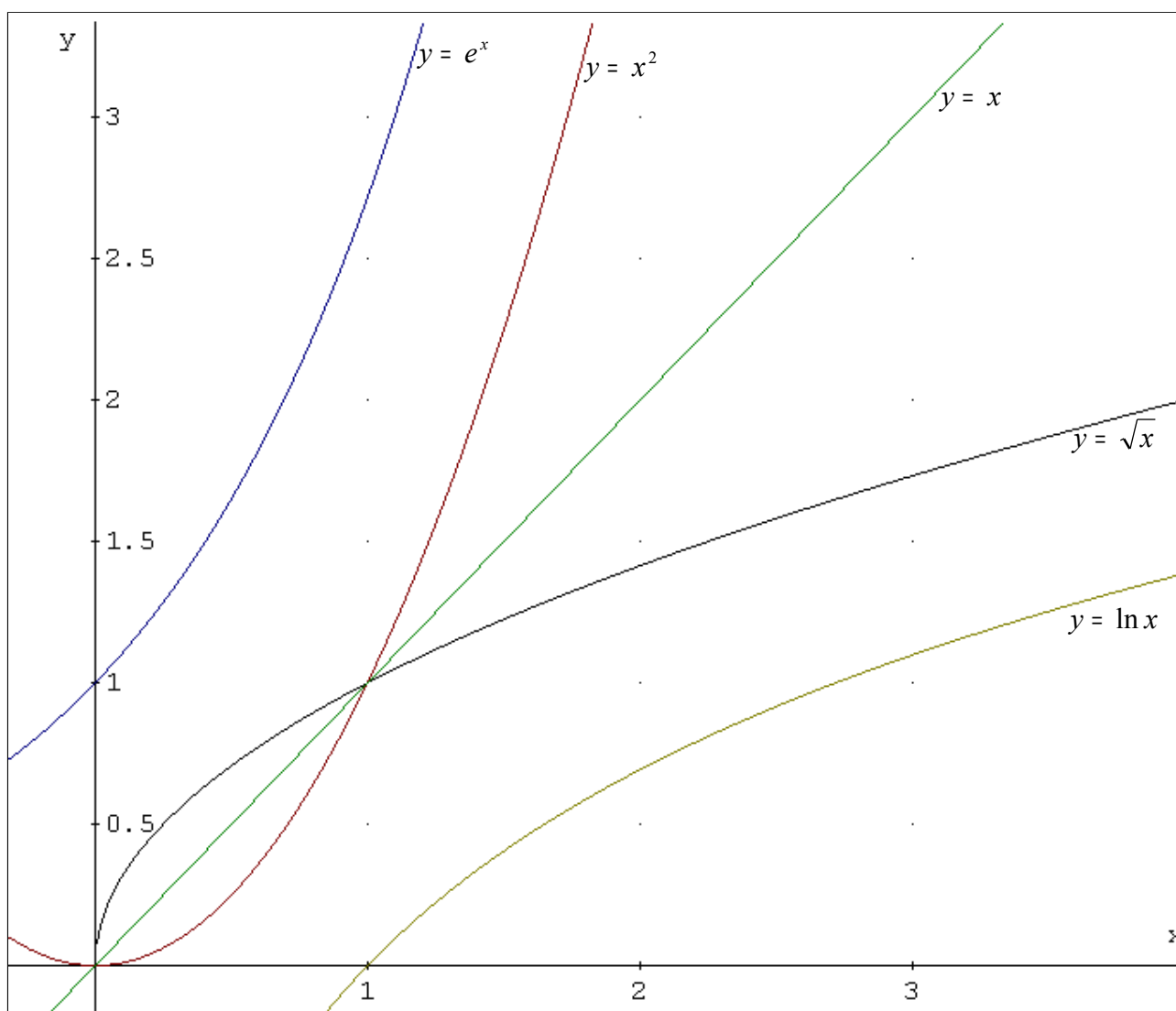
$$y = \operatorname{arctg} x$$

**Dominio:**  $(-\infty; +\infty)$

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## CONFRONTO DI INFINITI



Osservando il grafico, si nota che le funzioni con  $\lim_{x \rightarrow +\infty} f(x) = +\infty$  raggiungono l'infinito con una "rapidità" diversa:

le f. esponenziali  $y = a^x$  (con  $a > 1$ ) crescono più velocemente delle funzioni  $y = x^a$  (con  $a > 0$ ), che, a loro volta, crescono più velocemente delle funzioni  $y = \log_a x$  (con  $a > 1$ ).

Questa proprietà stabilisce un "ordine" grazie al quale confrontando gli infiniti di queste funzioni si può concludere che:

$$\lim_{x \rightarrow +\infty} \frac{a^x}{x^a} = \infty$$

$$\lim_{x \rightarrow +\infty} \frac{x^a}{a^x} = 0$$

$$\lim_{x \rightarrow +\infty} \frac{x^a}{\log_a x} = \infty$$

$$\lim_{x \rightarrow +\infty} \frac{\log_a x}{x^a} = 0$$

$$\lim_{x \rightarrow +\infty} \frac{a^x}{\log_a x} = \infty$$

$$\lim_{x \rightarrow +\infty} \frac{\log_a x}{a^x} = 0$$

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