数学作图测试

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Chapter 1

Gnuplot 作图实例

万事开头难

```
plot f(x) w l lc 'black' lw 2 dt '-.-' title 'new function'
# plot f(x) with line linecolor 'black' linewidth 2 dashtype '-.-' title 'new
    function'
```
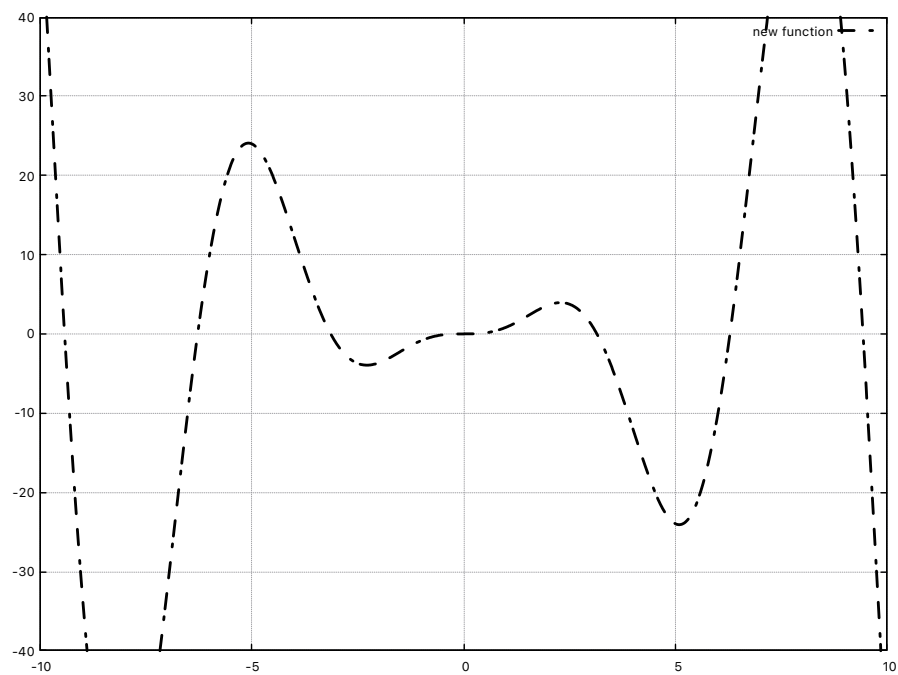
图 **1.1:** drawing a function

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```
#-----------------------------Global Setting----------------------------#

set term svg font 'Times New Roman'
set encoding utf8
```

```
set encoding iso_8859_1

set size 0.9,0.8
set out 'example_plot1.svg'


#-----------------------------------------------------------------------#

#--------------------------Axes and frames--------------------------
unset border

xmin = -4
xmax = 4
ymin = -1
ymax = 4


set xzeroaxis linetype 1 lc 'black'
set yzeroaxis linetype 1 lc 'black'
set style arrow 3 head filled size screen 0.03,15,45 lc black
set arrow 1 from 0, 1.02*ymin to 0,1.05*ymax arrowstyle 3
set arrow 2 from 1.02*xmin, 0 to 1.05*xmax,0 arrowstyle 3


set xtics 1 nomirror axis
set ytics 1 nomirror axis #offset -0.5*(xmax - xmin),0
#unset xtics
#unset ytics
set mxtics 2
set mytics 2


#-----------------------------------------------------------------

#------------------------content setting------------------------
set xrange[xmin:xmax]
set yrange[ymin:ymax]
set samples 1000
```

```
f(x) = 2**x
g(x) = (1.0/2.0)**x
h(x) = 5**x
i(x) = (1.0/5.0)**x


#-----------------------------------------------------------

#--------------------------label setting--------------------
set xlabel '$x$'
set ylabel '$y$'
unset xlabel
unset ylabel
set label '{$x$}' at 1.05*xmax, 0.3 offset char 0, char 0 center font 'Times New
    Roman,22'
set label '{$y$}' at 0.3, 1.05*ymax offset char 0, char 0 center font 'Times New
    Roman,22'


set key top right
#------------------------------------------------------------------

#-----------------------Start plotting------------------------------------
plot f(x) lc 'red' lw 2, g(x) lc 'blue' lw 2, h(x) lc 'red' lw 2 dt '-', i(x) lc '
    blue' lw 2 dt '-'
```
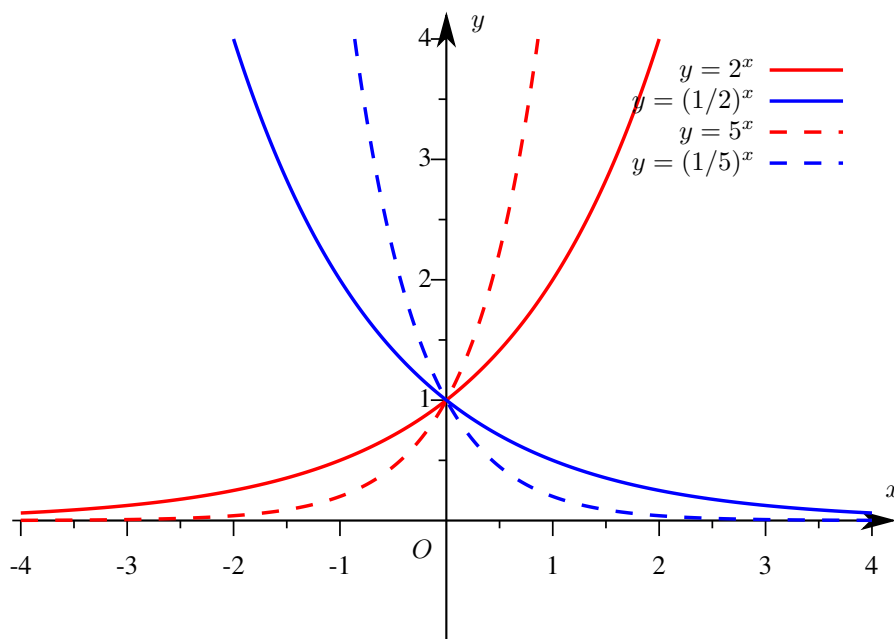
图 **1.2:** 完整的作图示范

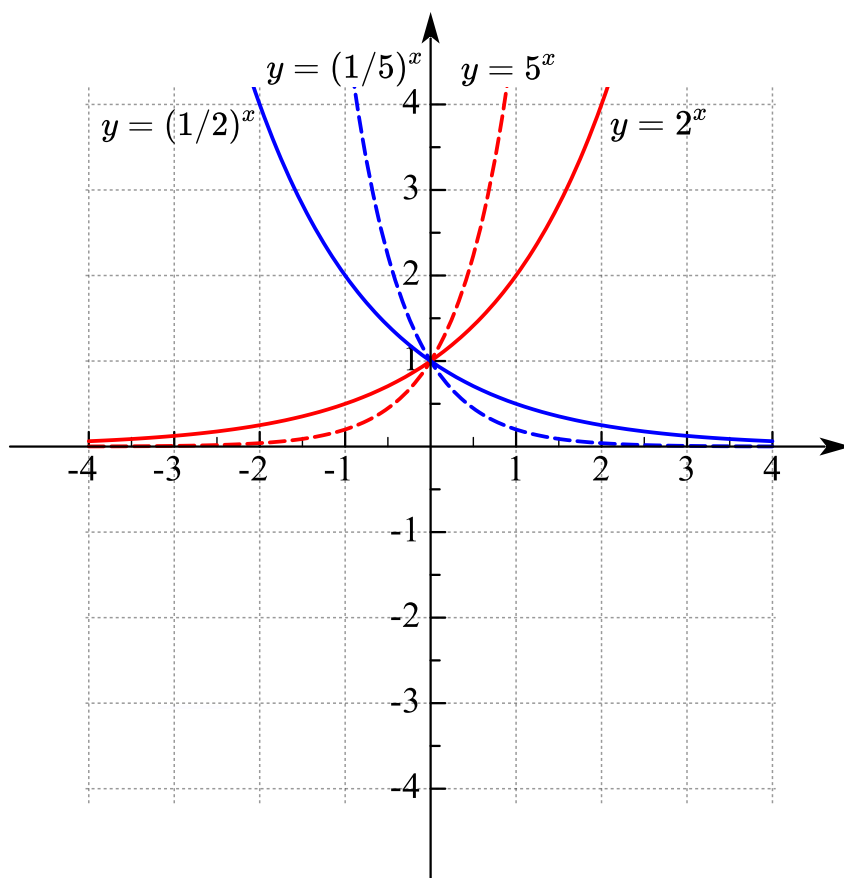图 **1.3:** 相同的图像：与 AxGlyph 出图对比

1.1 预赛答案

2022:

$\dfrac{38}{27}$; $-\dfrac{\sqrt{21}}{14}$; 32; $[4-\sqrt{6}, 4)$; 288; $\dfrac{\sqrt{7}}{4}$; 3; 81.

$y = 2 - \dfrac{x^2}{8} \ (-4 \le x \le 4)$; $\dfrac{1}{2} \le \lambda \le 2$.

$a_n = 1$.

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2021:

$-\dfrac{1}{4}$; 27; $\dfrac{\sqrt{6}}{3}$; 3; $[0, 1]$; 2^{1011}; $\dfrac{17}{21}$; 3816.

$(x+1)^2 + \dfrac{4}{3}y^2 = 1 \ (y \ne 0)$.

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