

Curve Sketching

start with $f(x)$

say $f(x) = 3x^2 + 5$

$a f(x)$ stretches the curve
by a factor "a" in the y-axis.

$f(ax)$ compresses the curve
by a factor "a" in the x-axis.

$f(x+b)$ moves b steps to left

if $b = 3$ then $y_{new} = 3(x+3)^2 + 5$

$-f(-x)$

rotates through 180 degrees
ie a reflection in both x and y axis
If $f(x) = -f(-x)$ then
this is an ODD function.
It is the summation of odd terms of x
Typical is the sine curve.

$f(x) + b$

moves b steps up

if $b = 3$ then $y_{new} = 3x^2 + 5$

$f(x-b)$ moves b steps to the right

if $b = 3$ then $y_{new} = 3(x-3)^2 + 5$

$f(x) - b$

moves b steps down

if $b = 3$ then $y_{new} = 3x^2 - 1$

$f(-x)$ reflects in the y-axis

If $f(x) = f(-x)$ then

this is an EVEN function.

It is the summation of even terms of x

Typical is the cosine curve.

$-f(x)$ reflects in the x-axis

You don't get functions where

$f(x) = -f(x)$ y must have single value

It's just two separate curves.

$y_{new} = -(3x^2 + 5) = -3x^2 - 5$

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