Function Diagrams

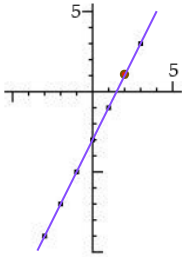
Henri Picciotto
henri@MathEducationPage.org
www.MathEducationPage.org
blog.MathEducationPage.org

$y = 2x - 3$

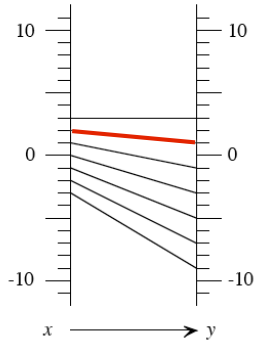
Table

x	y
3	3
2	1
1	-1
0	-3
-1	-5
-2	-7
-3	-9

Graph



Function Diagram



Function diagram and Cartesian representation

Your Turn

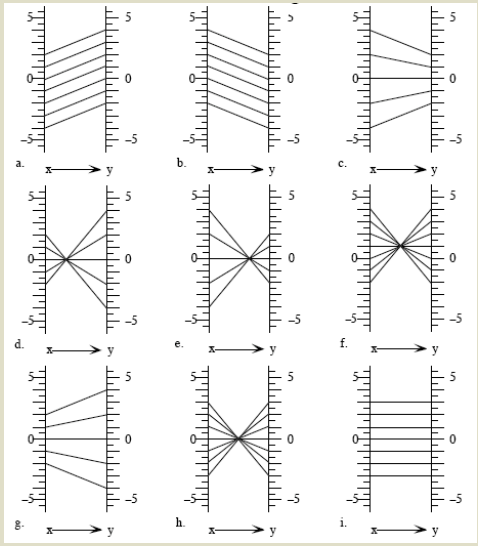
Make a function diagram for
$y = -2x + 3$
or $y = 2x + 3$

Use a ruler!
Put the number lines 6 units apart.

The Plan

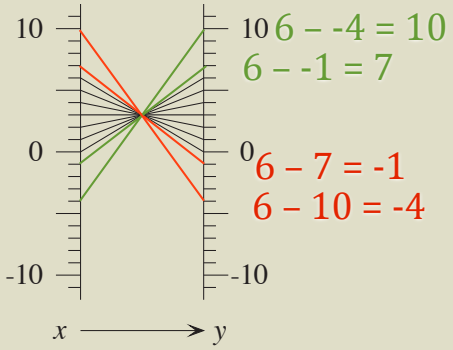
- Linear Functions
- Functions in General
- Dynamical Systems
- Proofs

Linear Functions

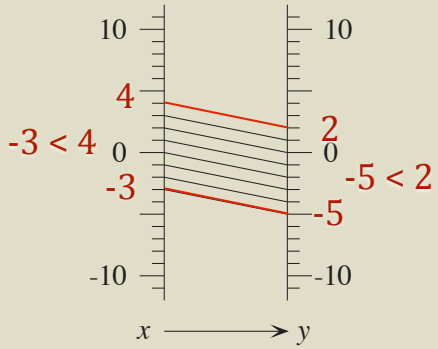

a.
b.
c.
d.
e.
f.
g.
h.
i.
x
y
5
0
–5

Arithmetic

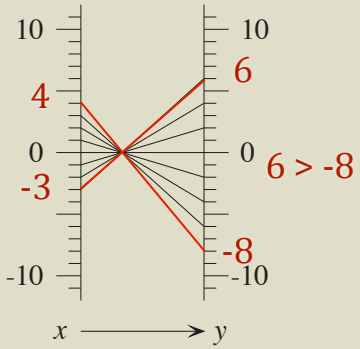
$y = 6 - x$



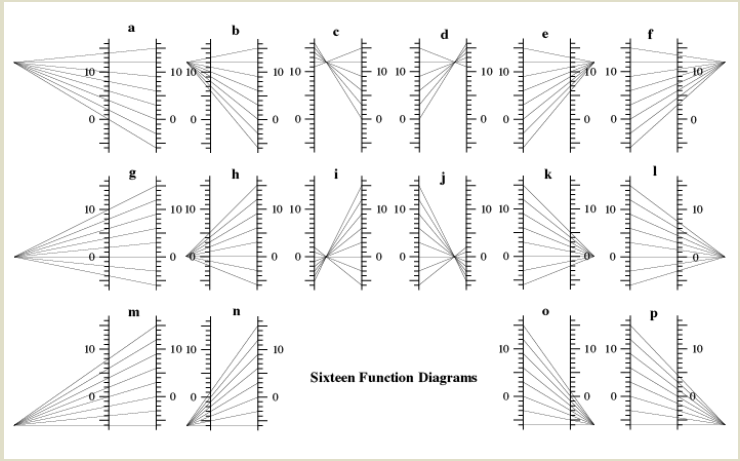
Solving Inequalities



add -2



multiply by -2


a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
10
0
Sixteen Function Diagrams

Mark Grotjahn's Paintings

The Focus

focus

Families of Functions

$m = 3$

$b = -2$

two linear functions

Duality

Solving a System of Linear Equations

Functions in General

Magnification

magnification

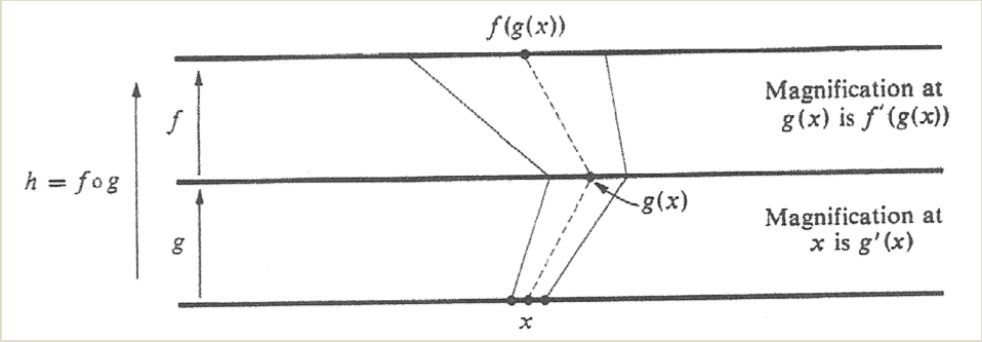
The Magnification Dance

Composition

composition of two functions

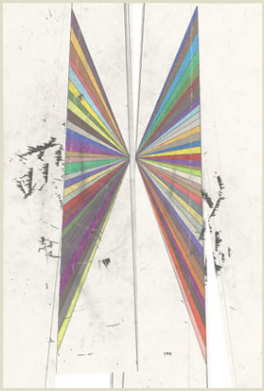
Sherman Stein

Calculus and Analytic Geometry (1977)



Inverse Function

a function and its inverse



Definition, Domain, Range

Recognizing Functions

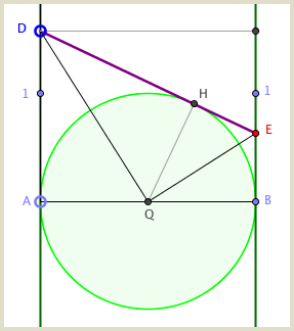
Name that function!

Making Diagrams for Documents

print

Interesting Particular Case

$y=1/x$


D
1
H
1
E
A
Q
B

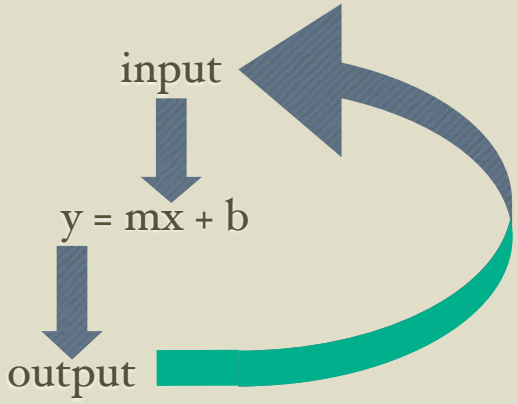
Dynamical Systems

Instant Riches

Amazing investment opportunity at Algebank! Double your money instantly! Invest any amount!
No amount is too small.
Our bank will double the amount of money in your account every month. Watch your money grow!

A service charge of $100 will be deducted from your account at the end of every month.

Iterating a Linear Function



Drugs!

To control a medical condition, Shine takes 10 milligrams of a certain drug once a day. Her body gets rid of 40% of the drug in a 24-hour period.

$$y = .6x + 10$$

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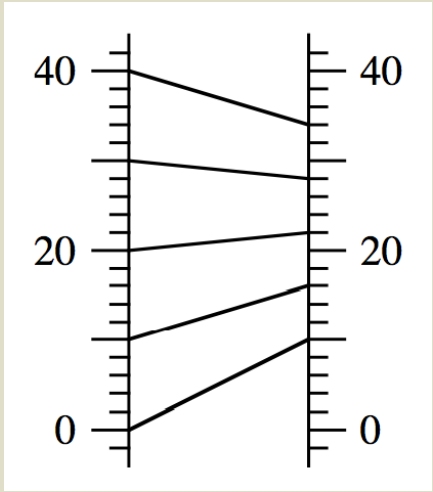
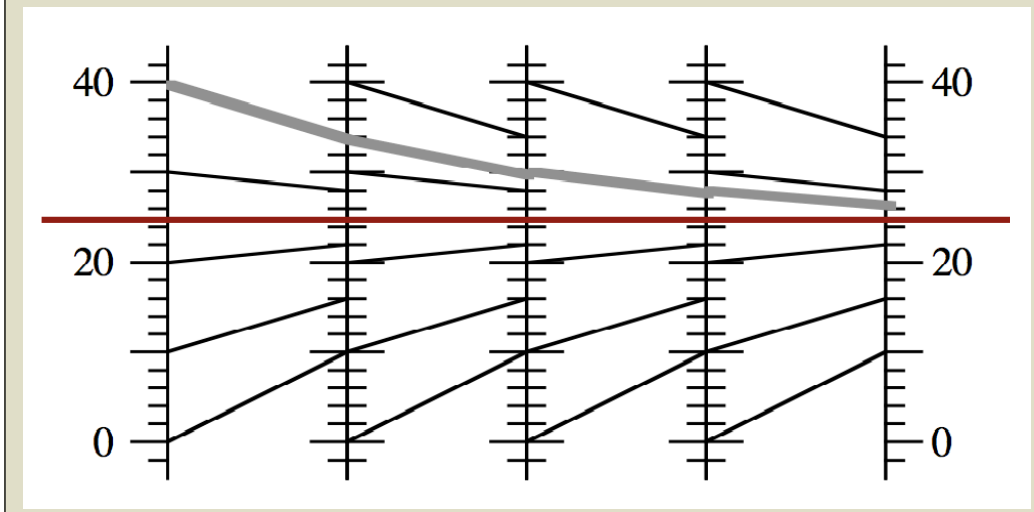
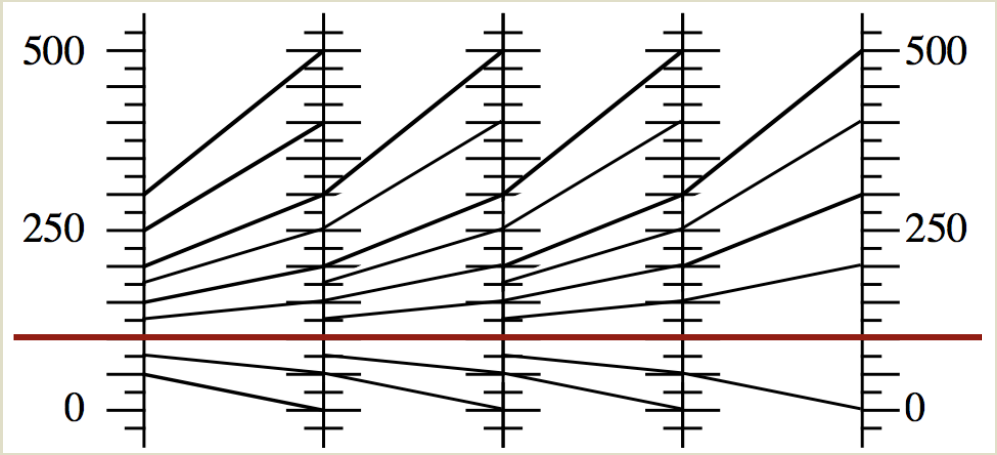
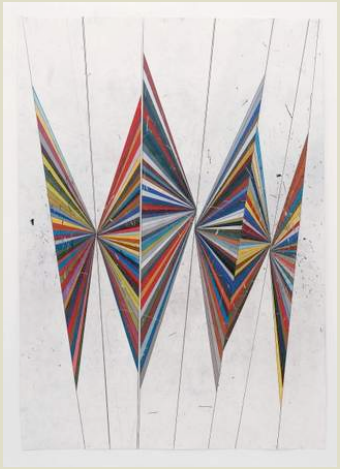



40
20
0
40
20
0

$$y = 2x - 100$$





An Educational Tool

Unfamiliar yet powerful

- Arithmetic & algebra
- Functions: definitions & behaviors
- Rate of change
- Composition & the chain rule
- Introduction to dynamical systems

Henri Picciotto
henri@MathEducationPage.org
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