



TWO SIGMA

FAMILY  
FRIDAYS

MO  MATH



# Mathematics - Starring YOU

August 2, 2019

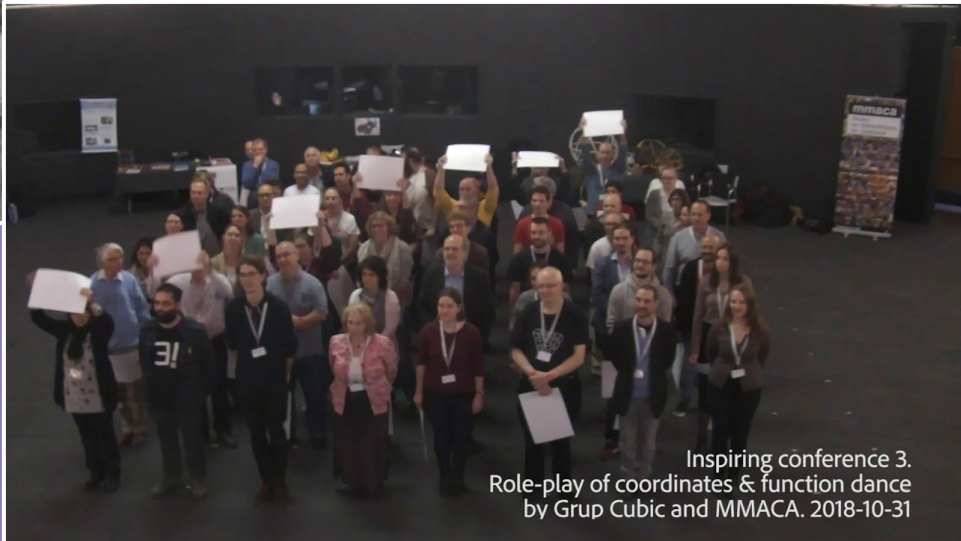
*Sergio Belmonte*  
(MMACA)

# Grup Cúbic



**Role-play in Maths Education**

# Have you ever been a mathematical object?



Inspiring conference 3.  
Role-play of coordinates & function dance  
by Grup Cubic and MMACA. 2018-10-31

So....

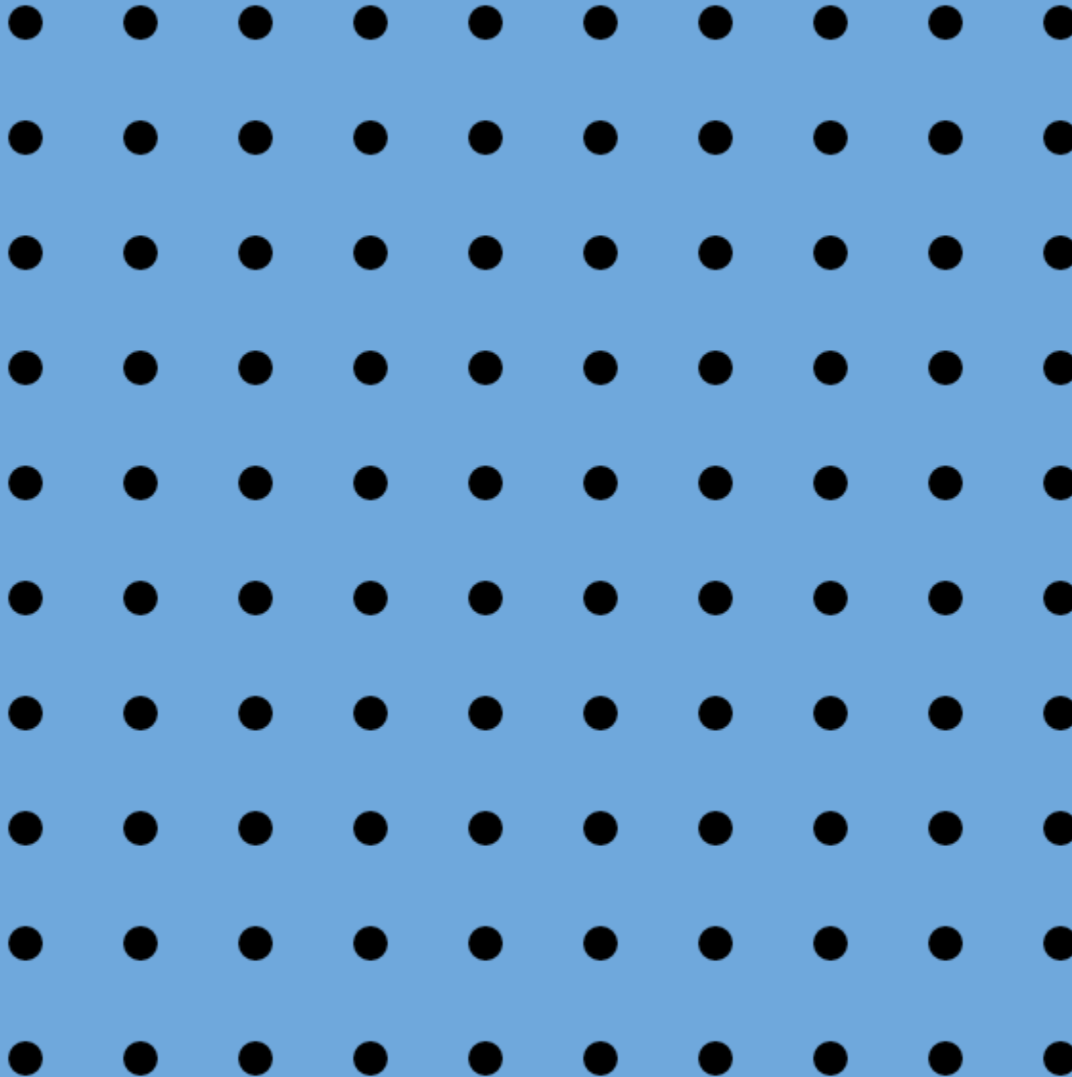
Let's  
Start



# The Coordinate System



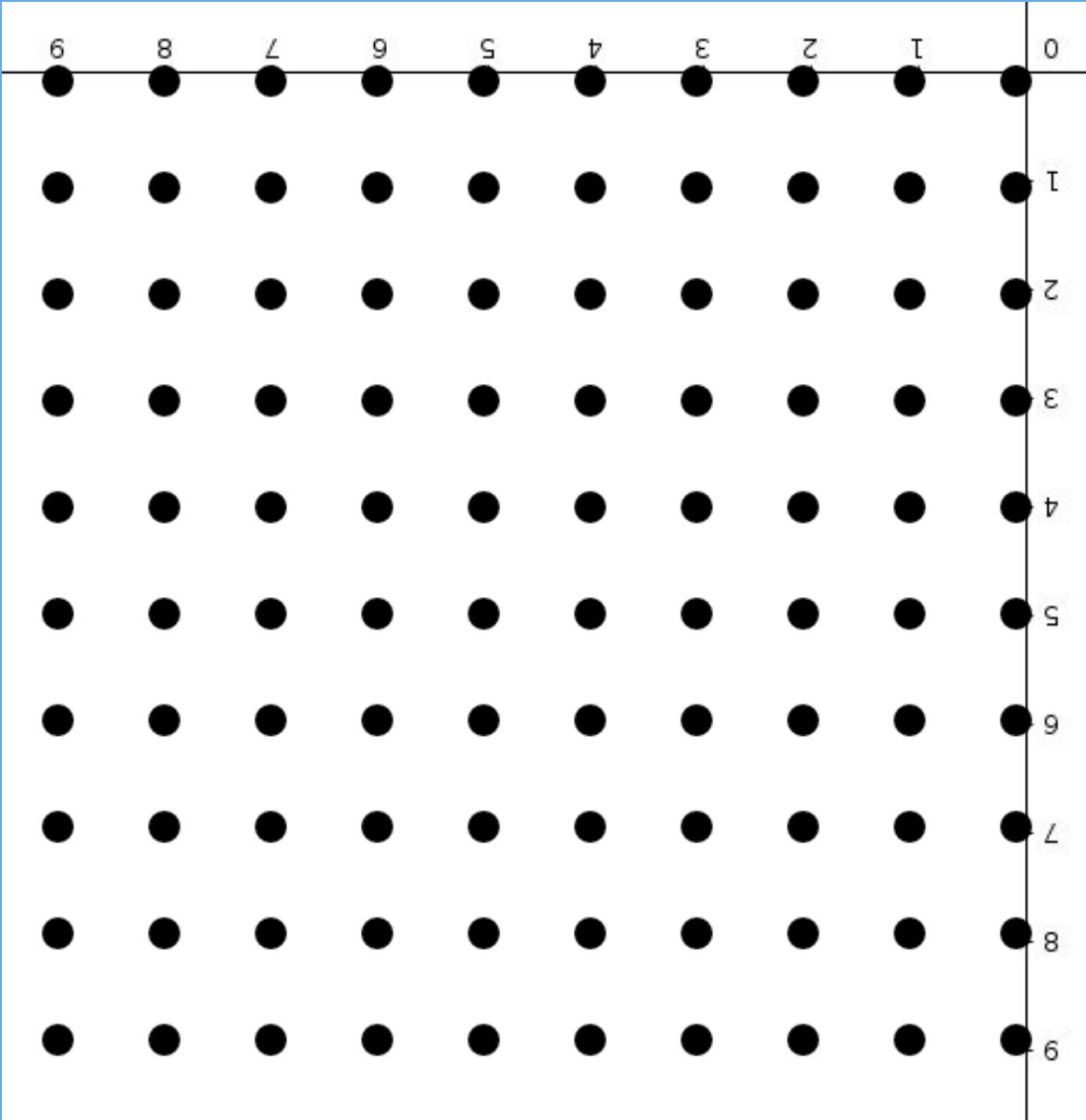
# Place yourselves in a grid



Let's introduce some order in here...



# Now you are dots in a coordinates system!





# EQUATIONS



$$x = 5$$

$$y = 5$$

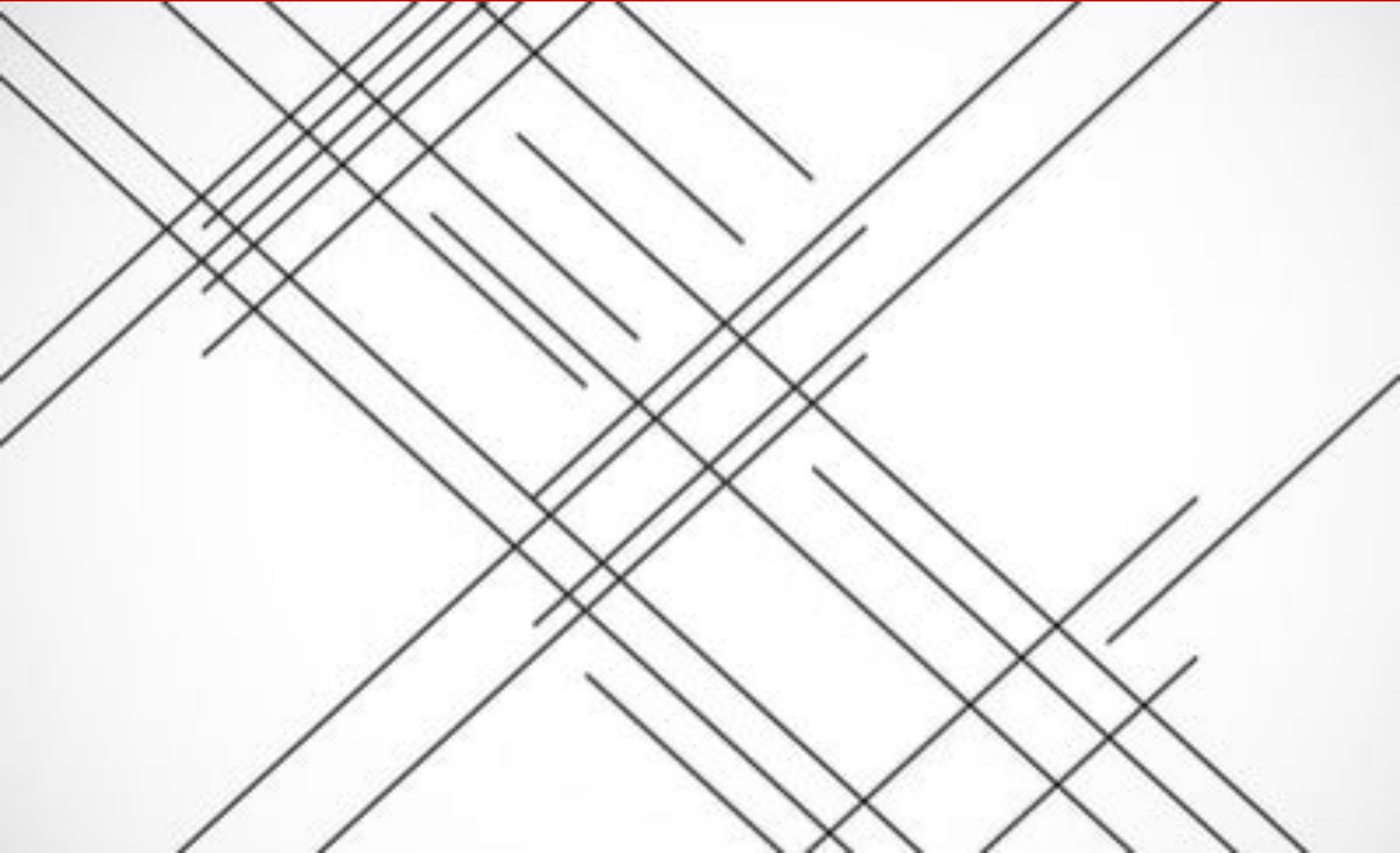
**x = y**

$$x - y = 1$$

$$y - x = 1$$

$$x + y = 10$$

# SYSTEM OF EQUATIONS





$$x = 8$$

$$x - y = 1$$

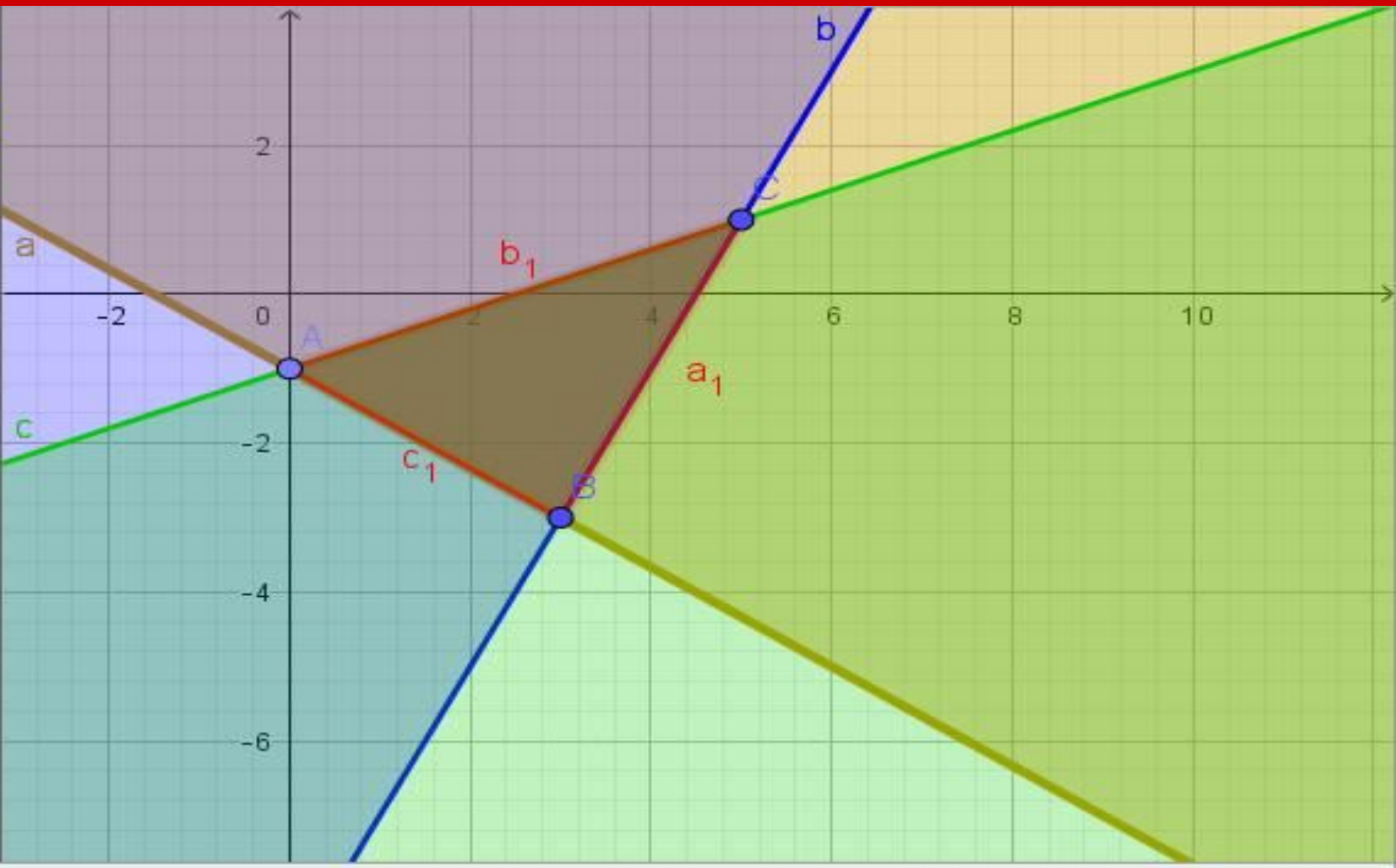
$$x \equiv y$$

$$x + y \equiv 6$$

$$x + y = 5$$

$$x + y = 12$$

# INEQUALITIES



$$x \geq 5$$

**y ≤ 5**

$$x \geq y$$

$$x - y \leq 10$$



**x**

**≥**

**1**

**&**

**y**

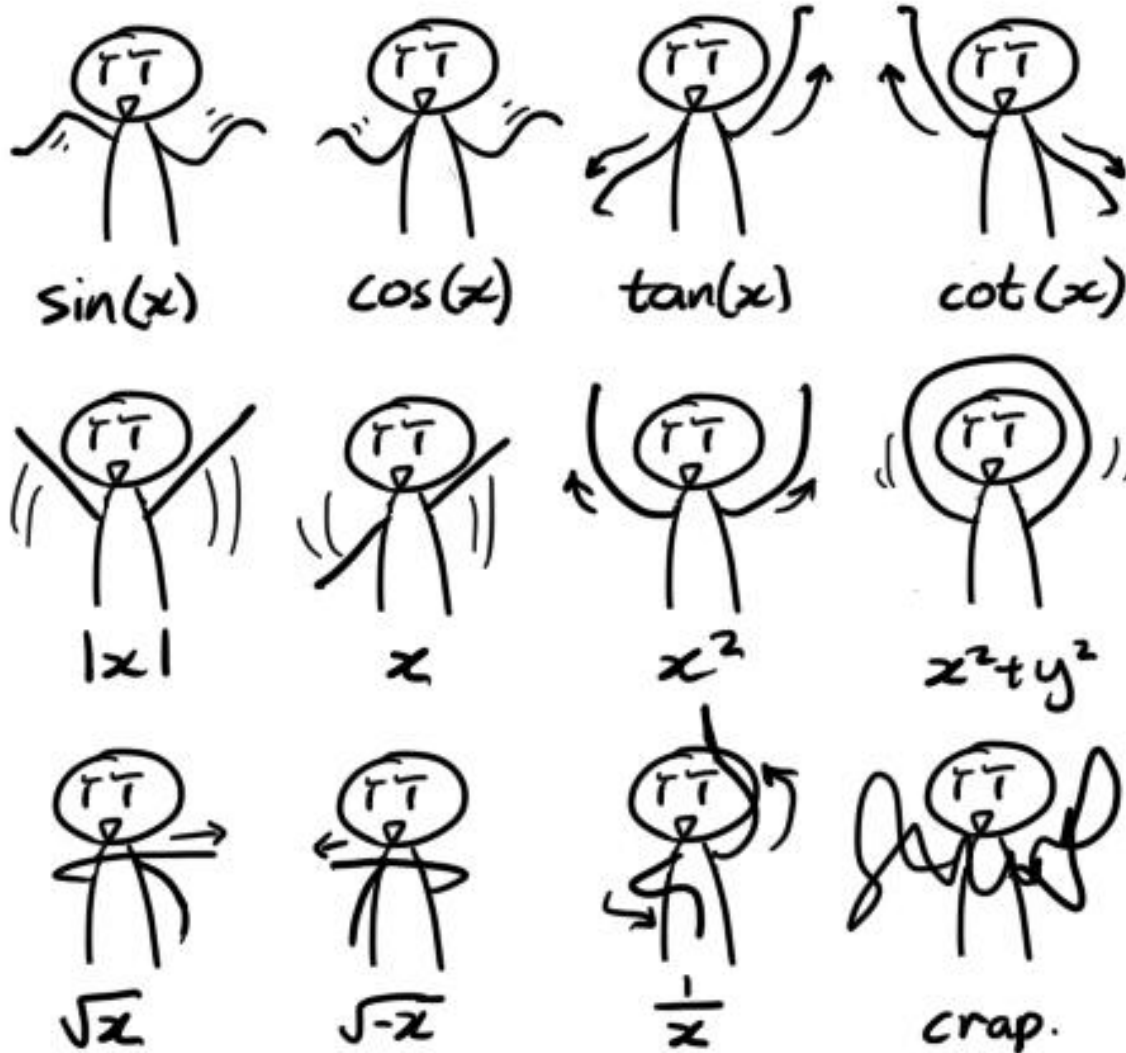
**≤**

**4**

$$x^2 + y^2 \geq$$

25

# FUNCTION DANCE

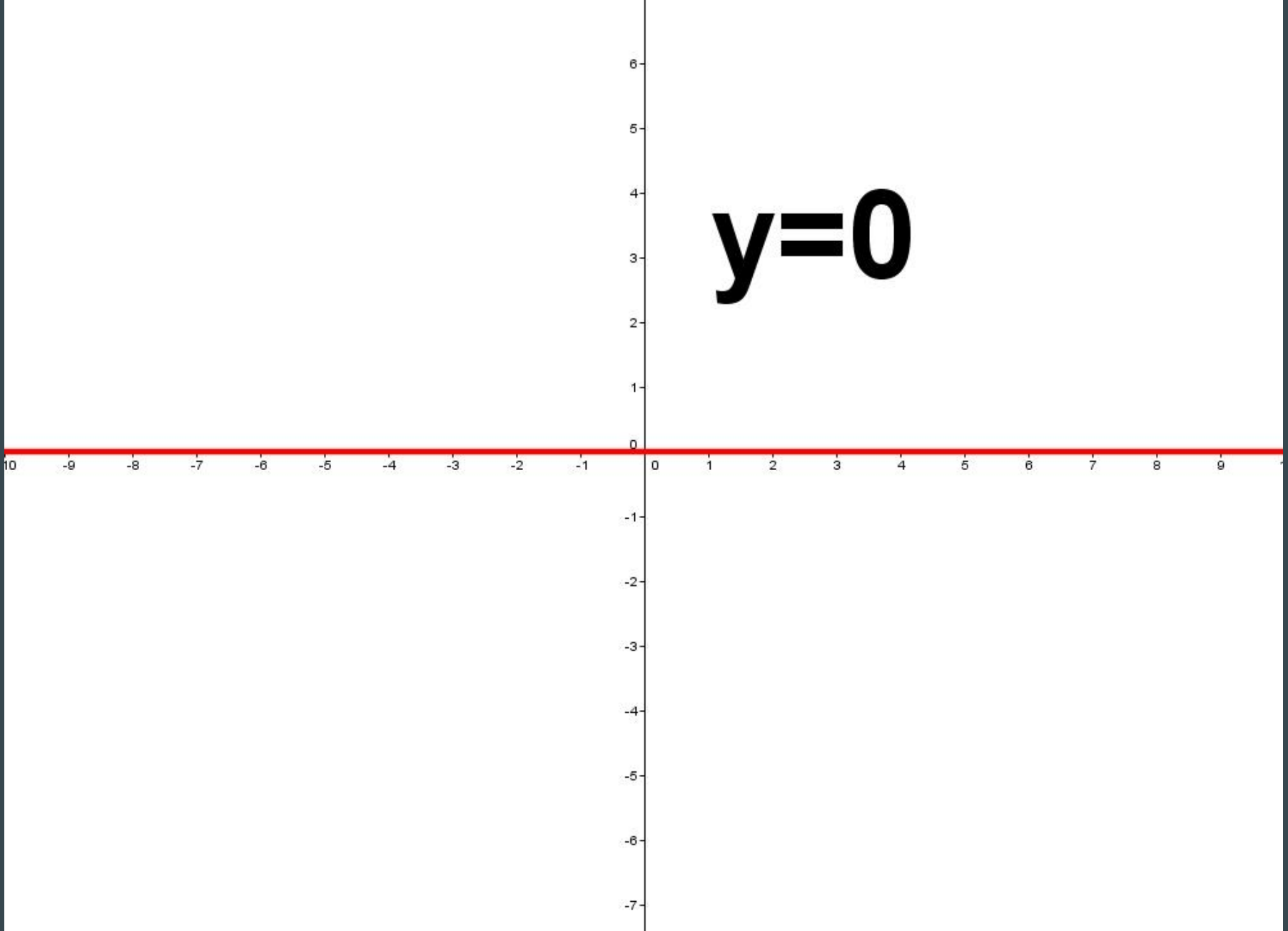


# *Lesson 1*

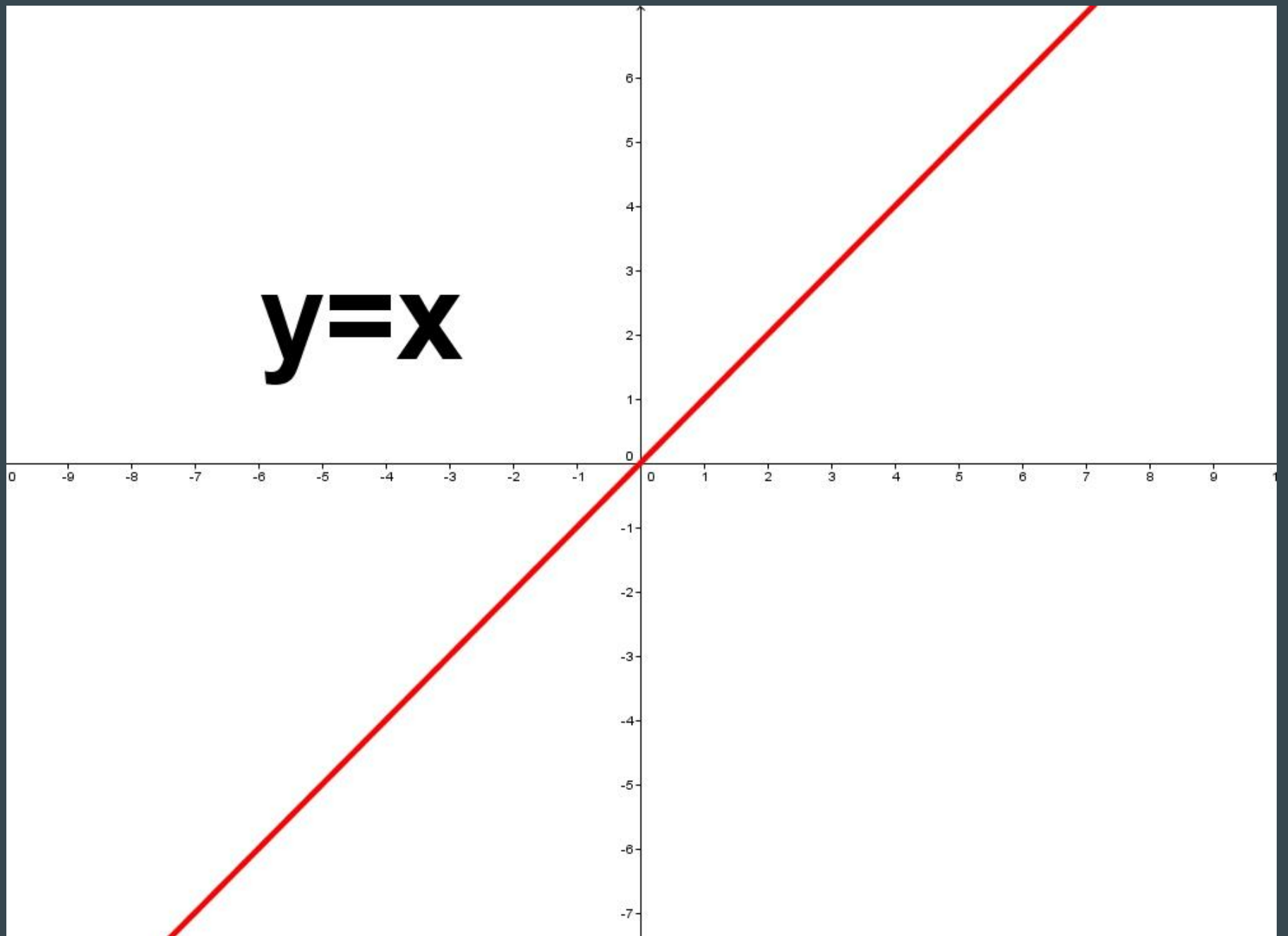
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## **Simple Movements**

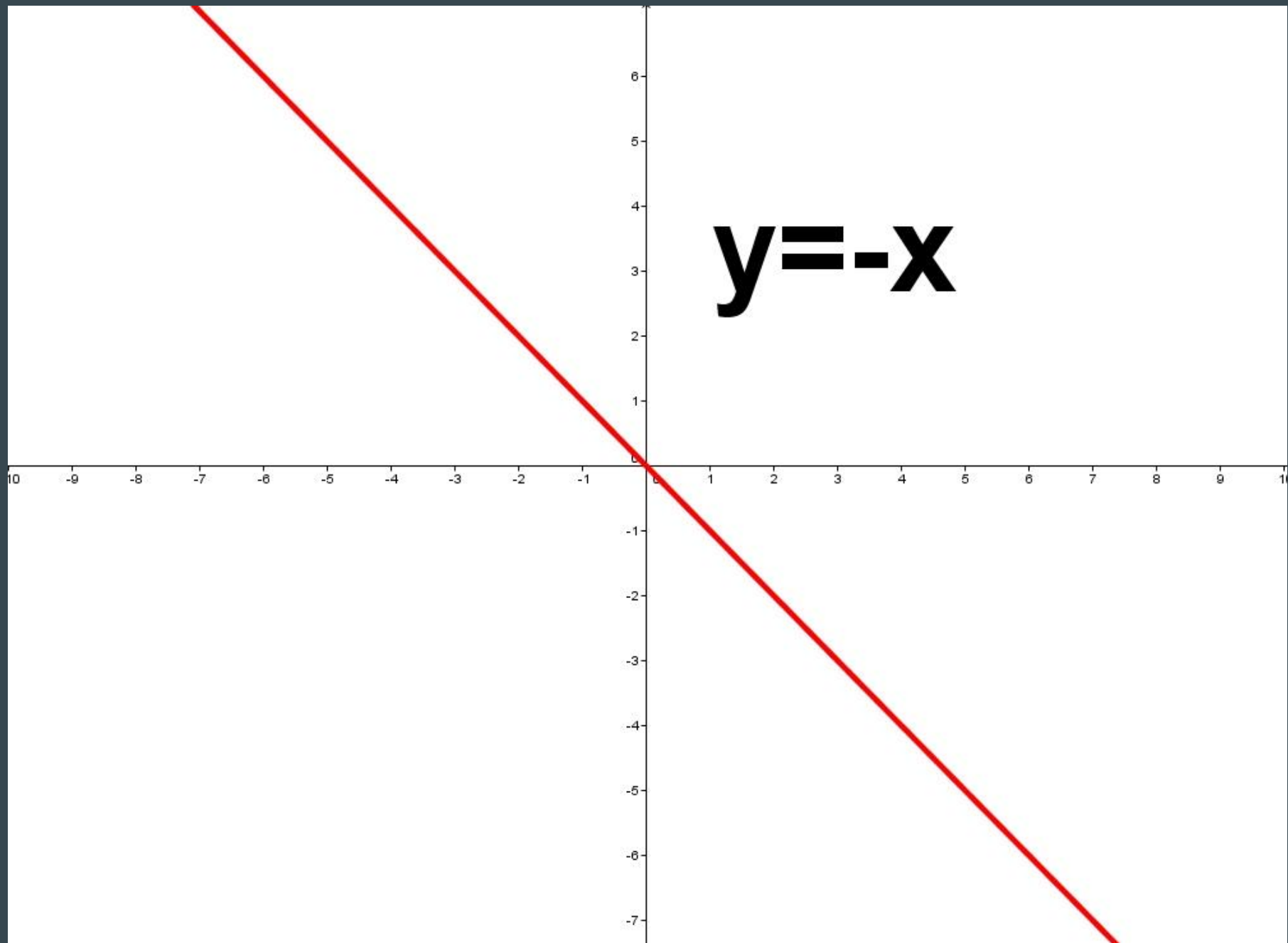
$$y=0$$

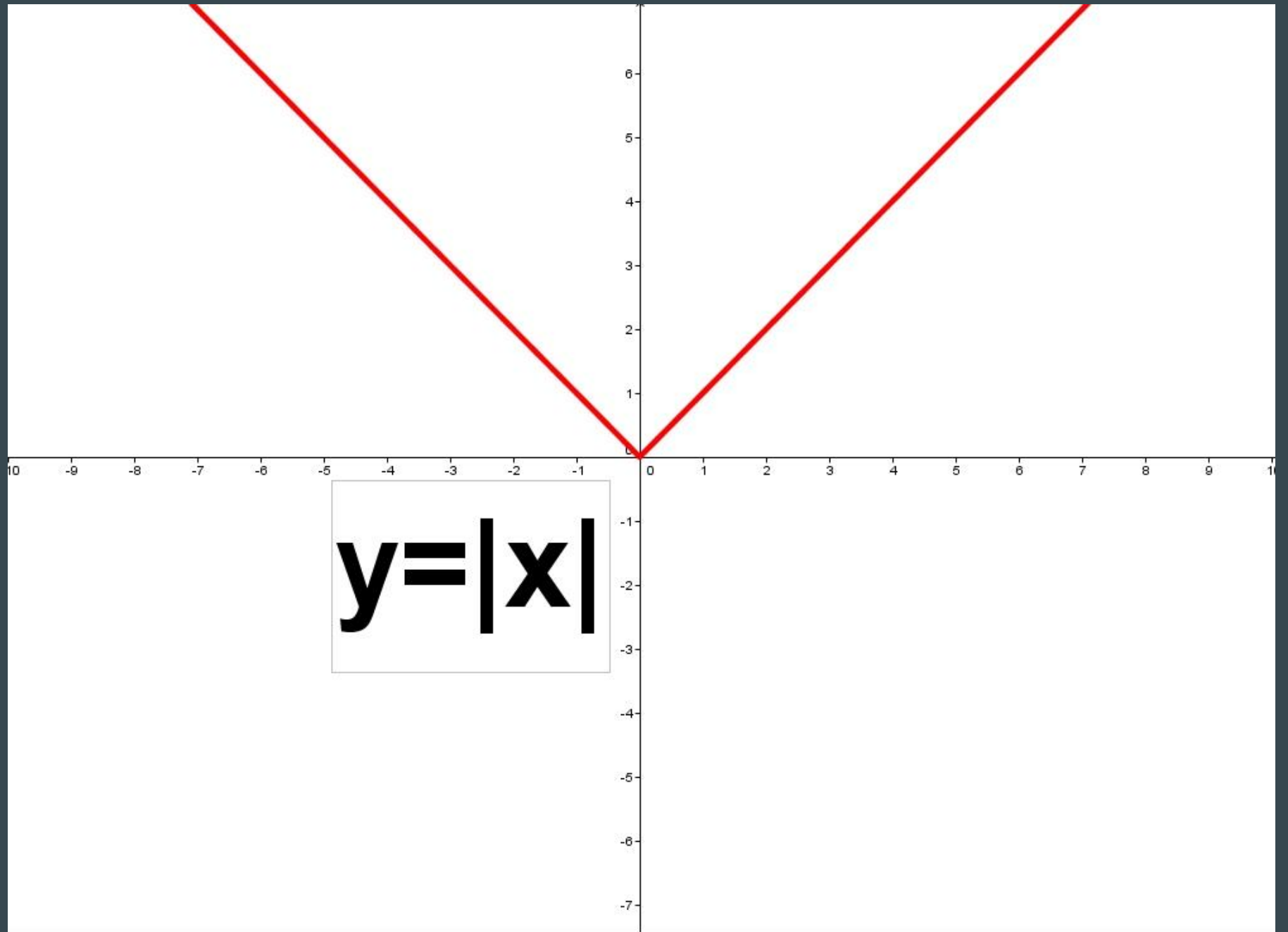


$$y=x$$



$$y = -x$$

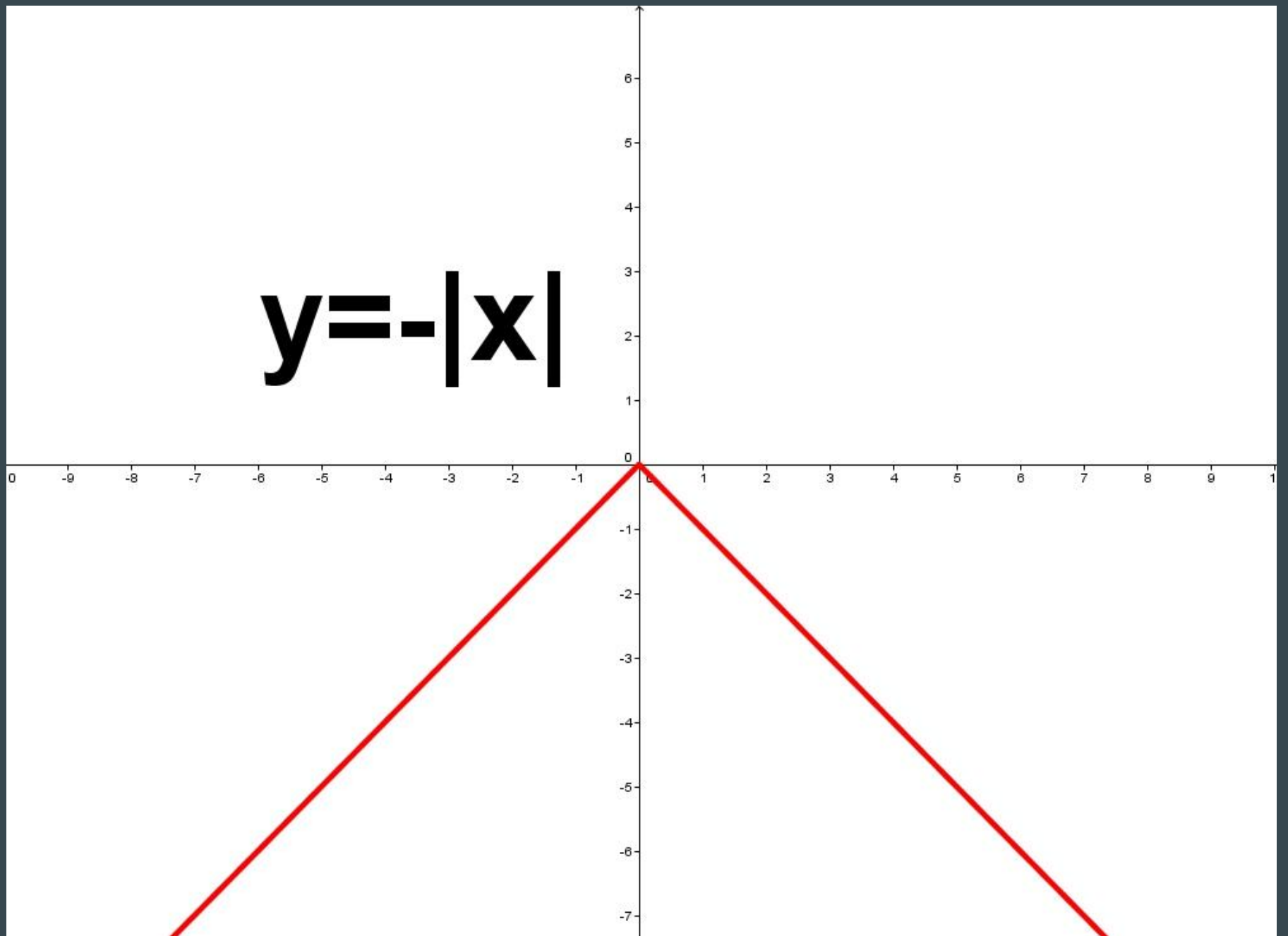


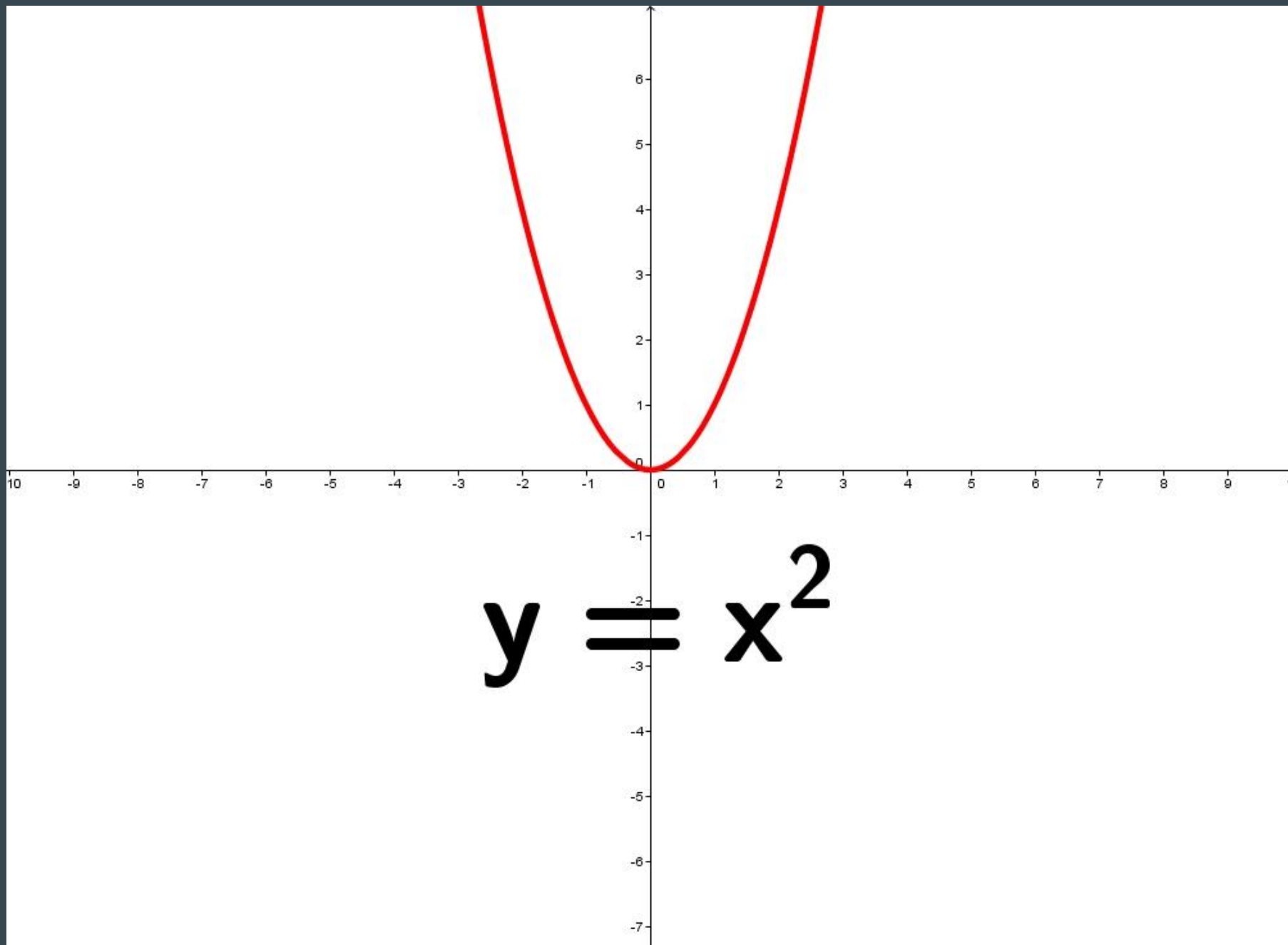


$$y = |x|$$

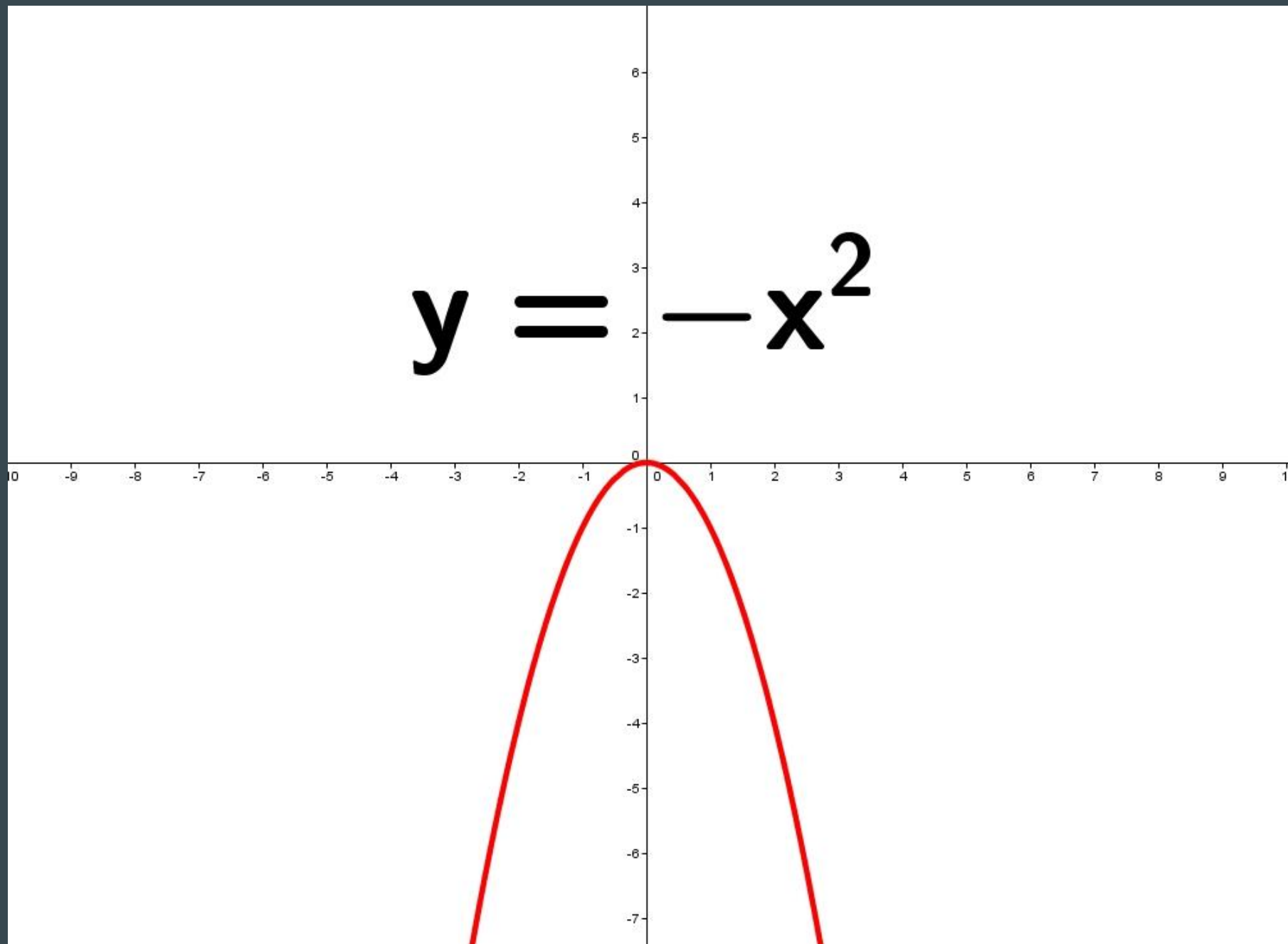


$$y = -|x|$$

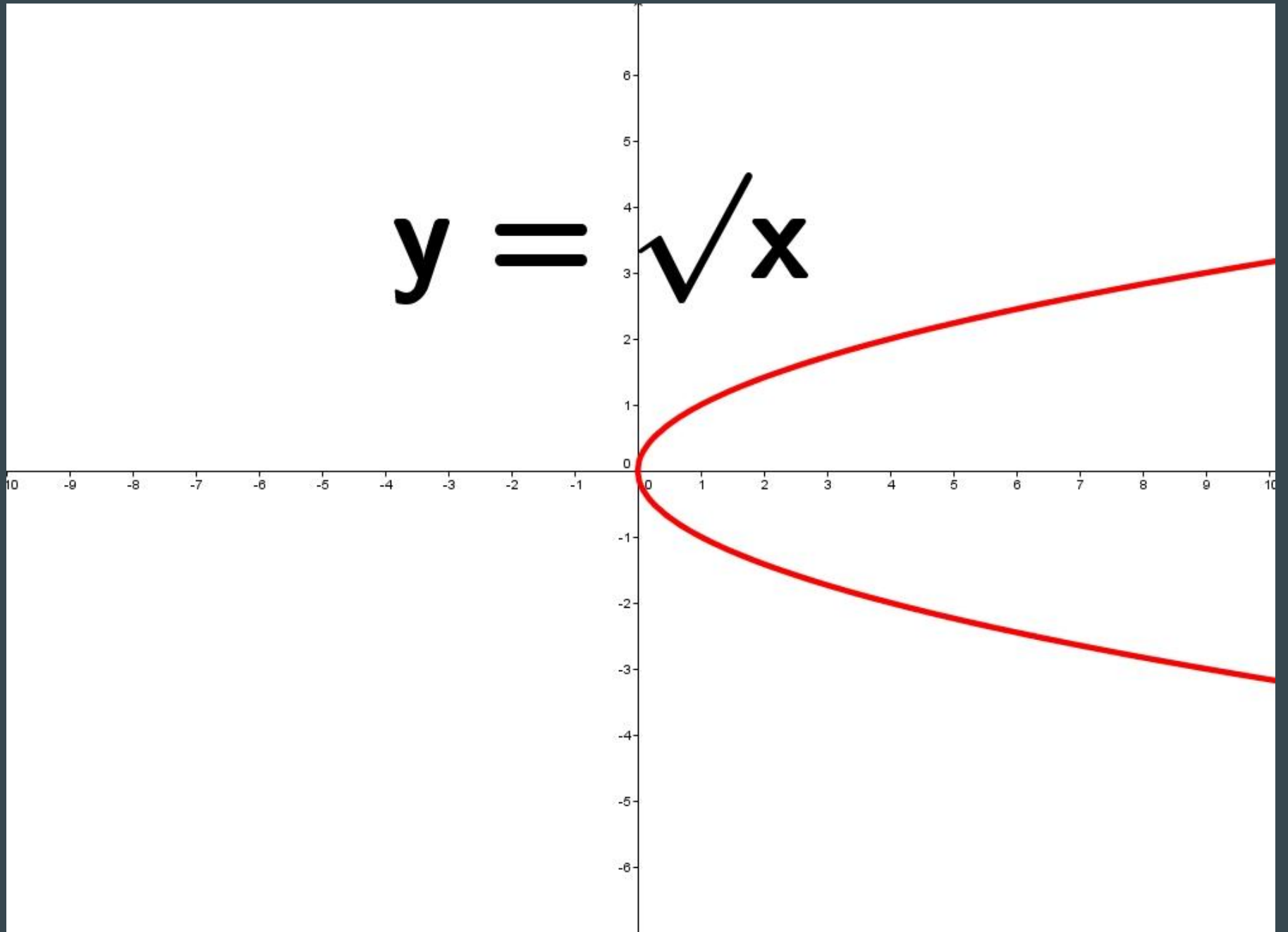




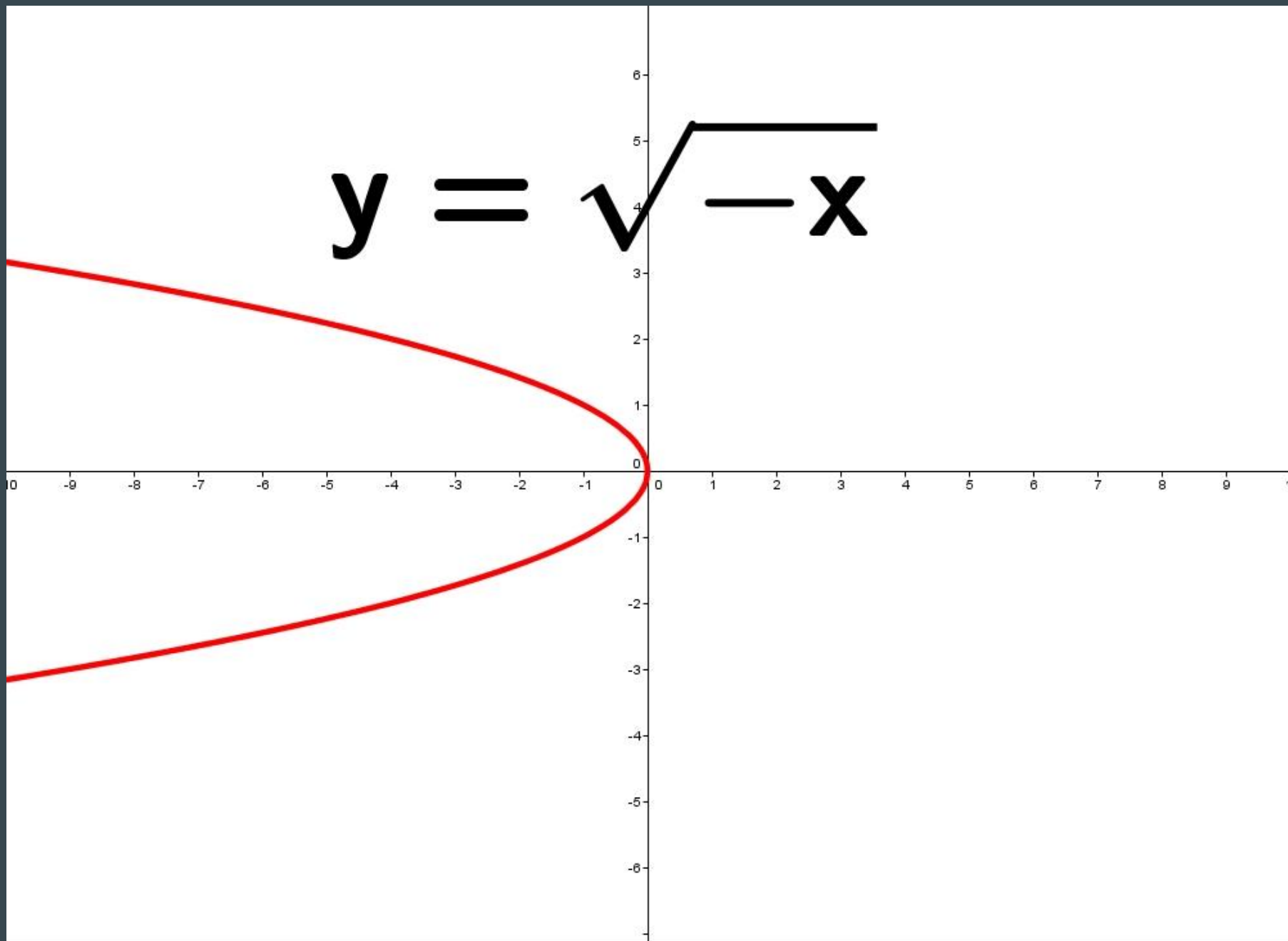
$$y = -x^2$$



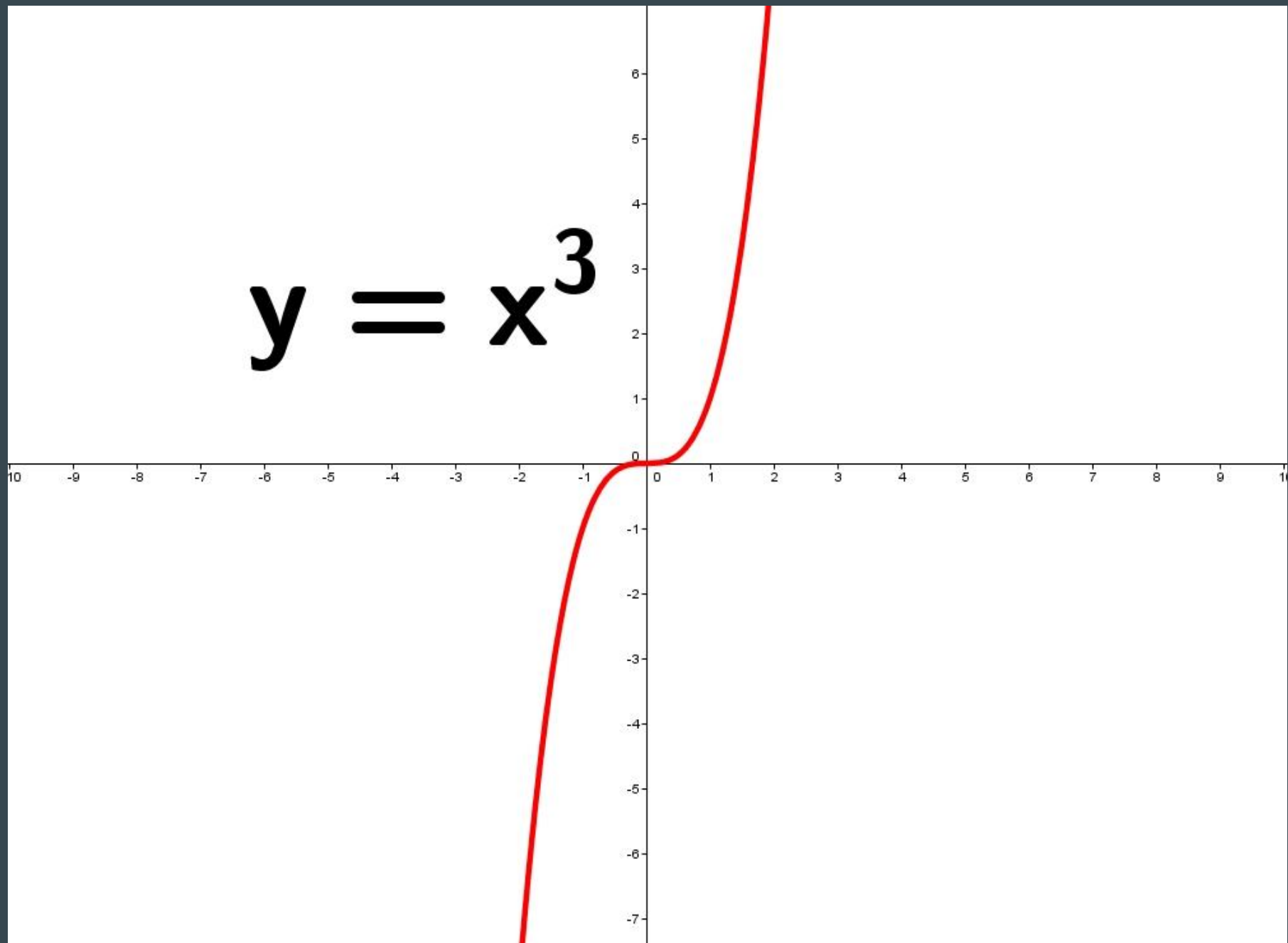
$$y = \pm \sqrt{x}$$



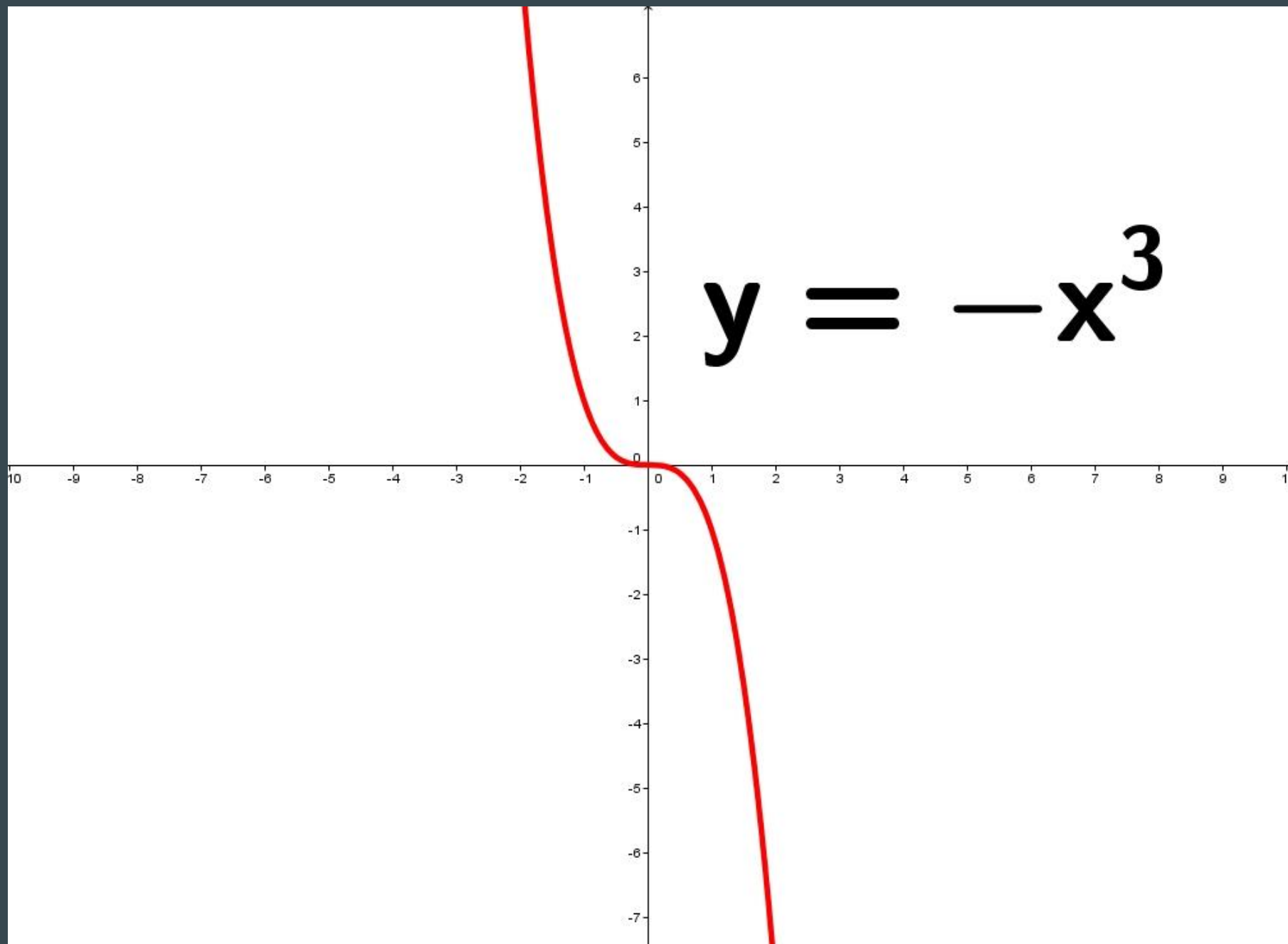
$$y = \sqrt{-x}$$

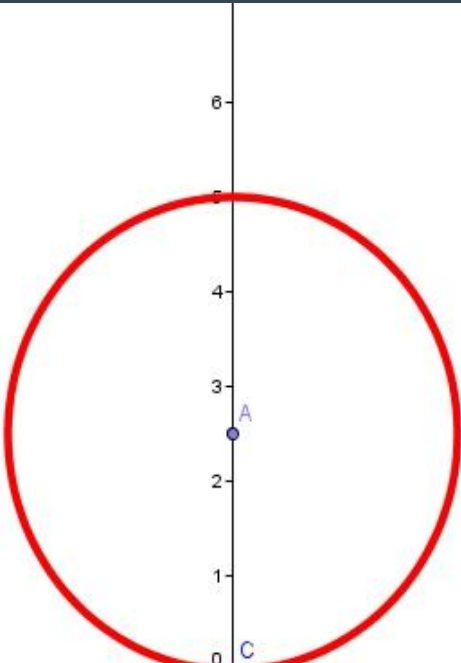


$$y = x^3$$



$$y = -x^3$$




$$x^2 + (y - 2,5)^2 = 6,25$$

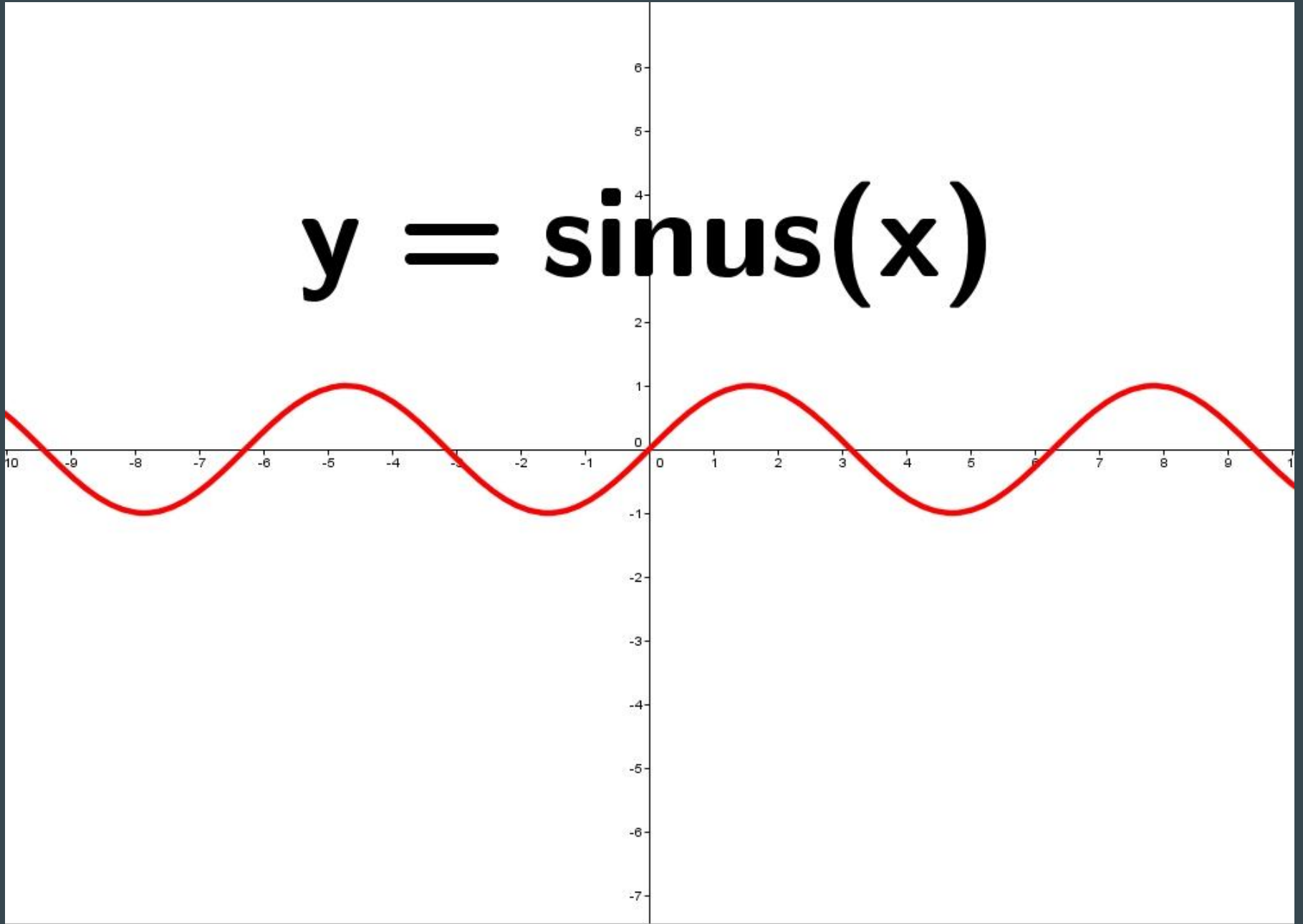


# *Lesson 2*

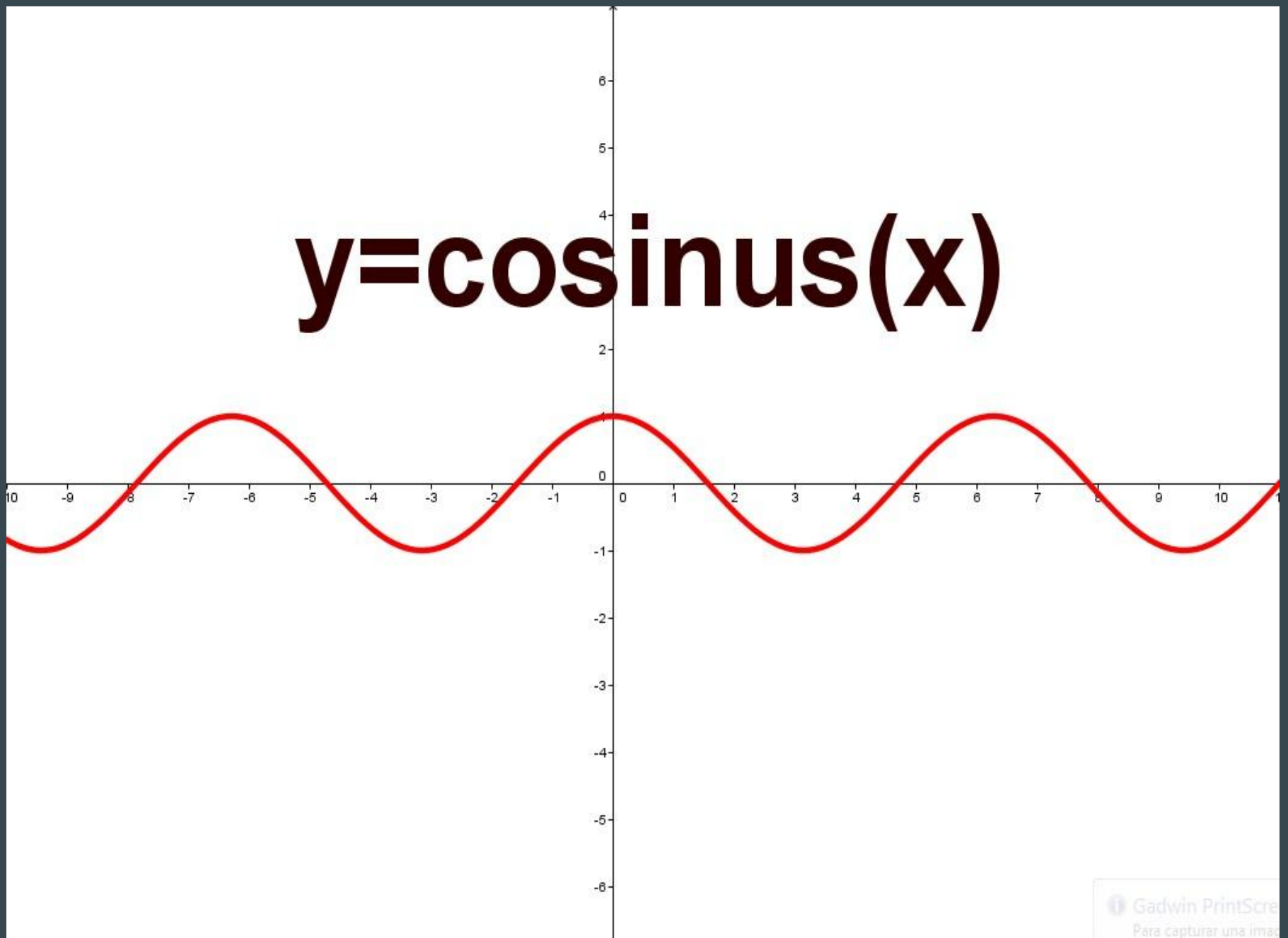
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## **Compound Movements**

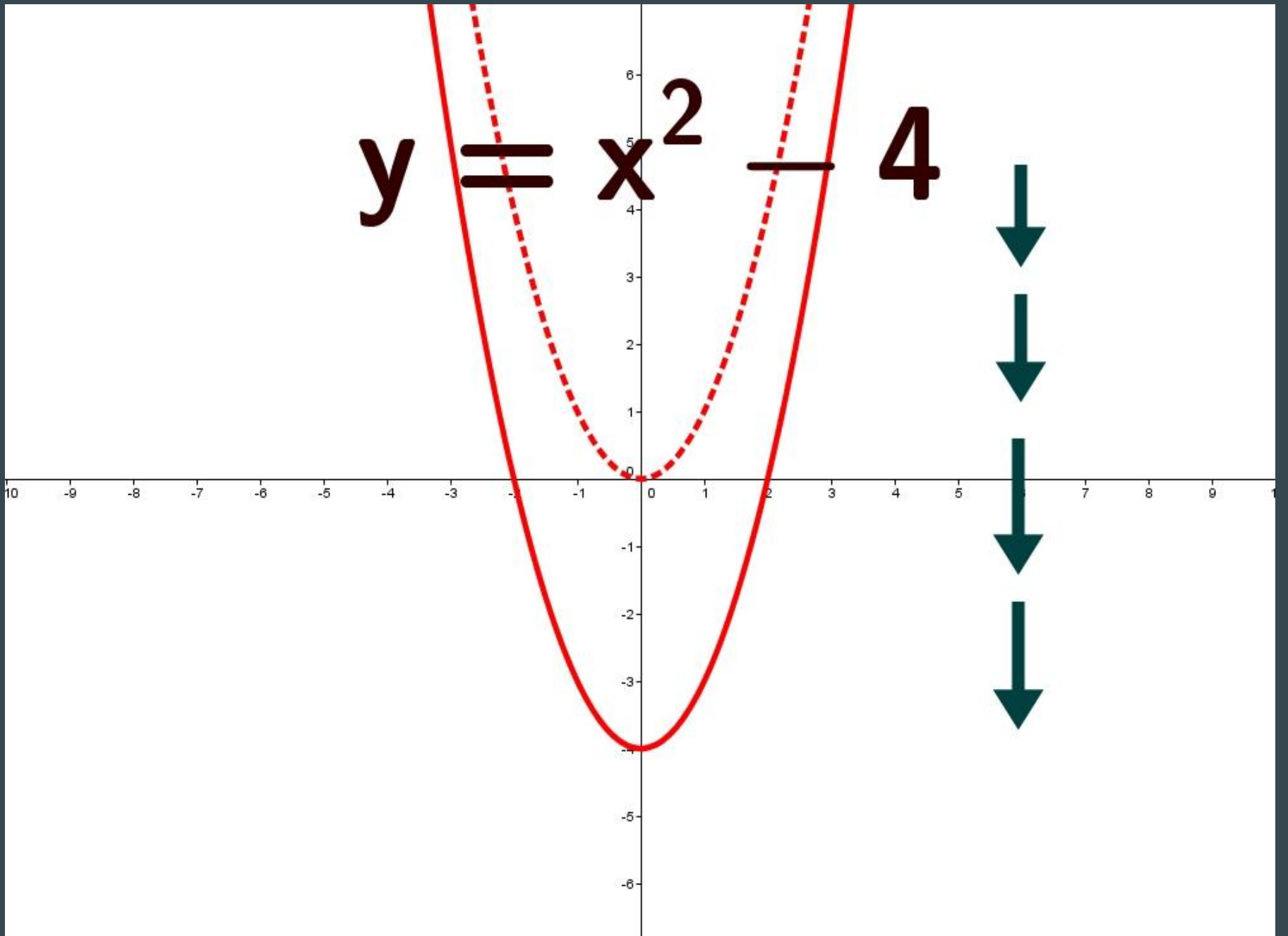
$$y = \sin(x)$$



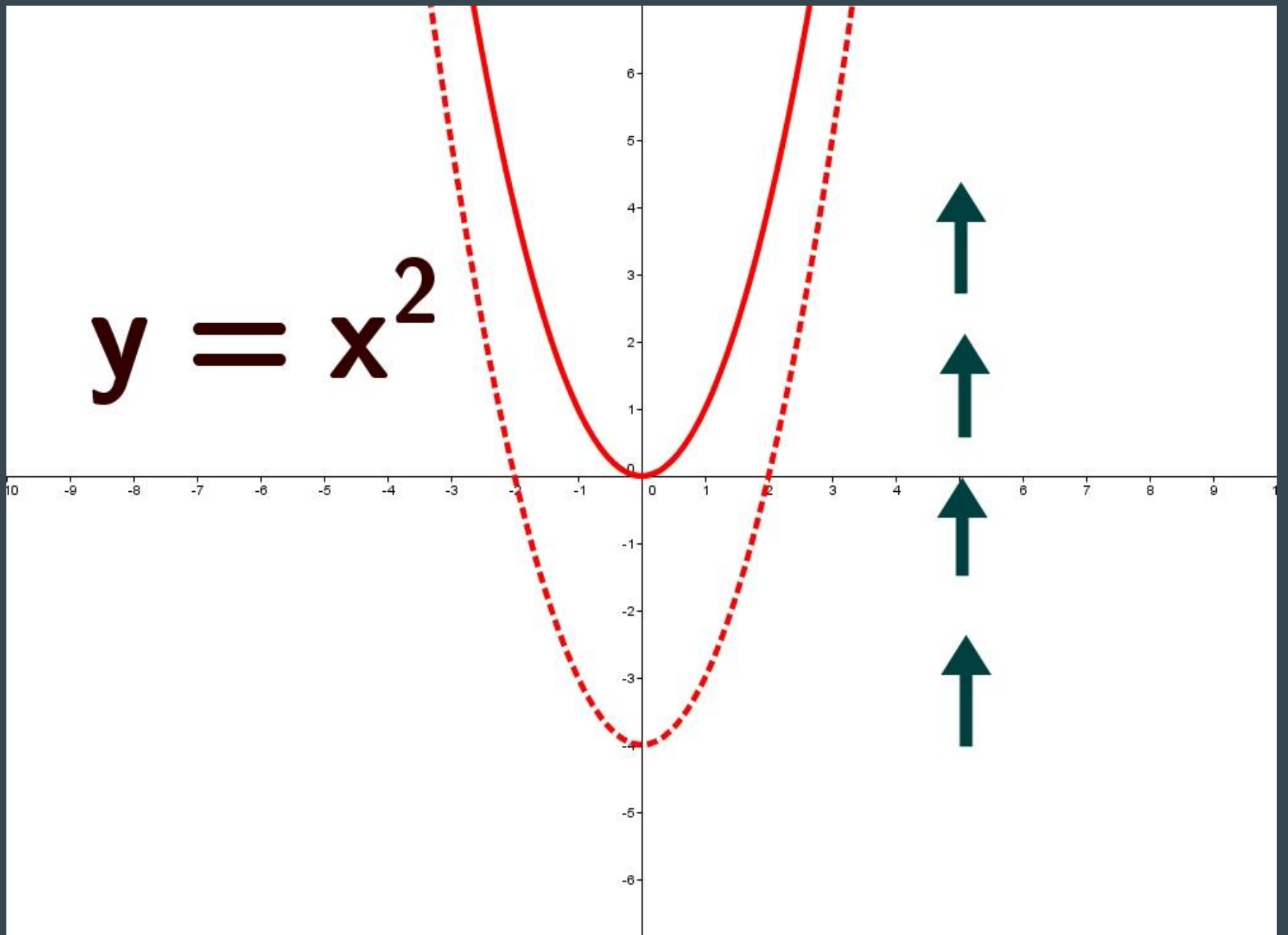
$$y = \cos(x)$$



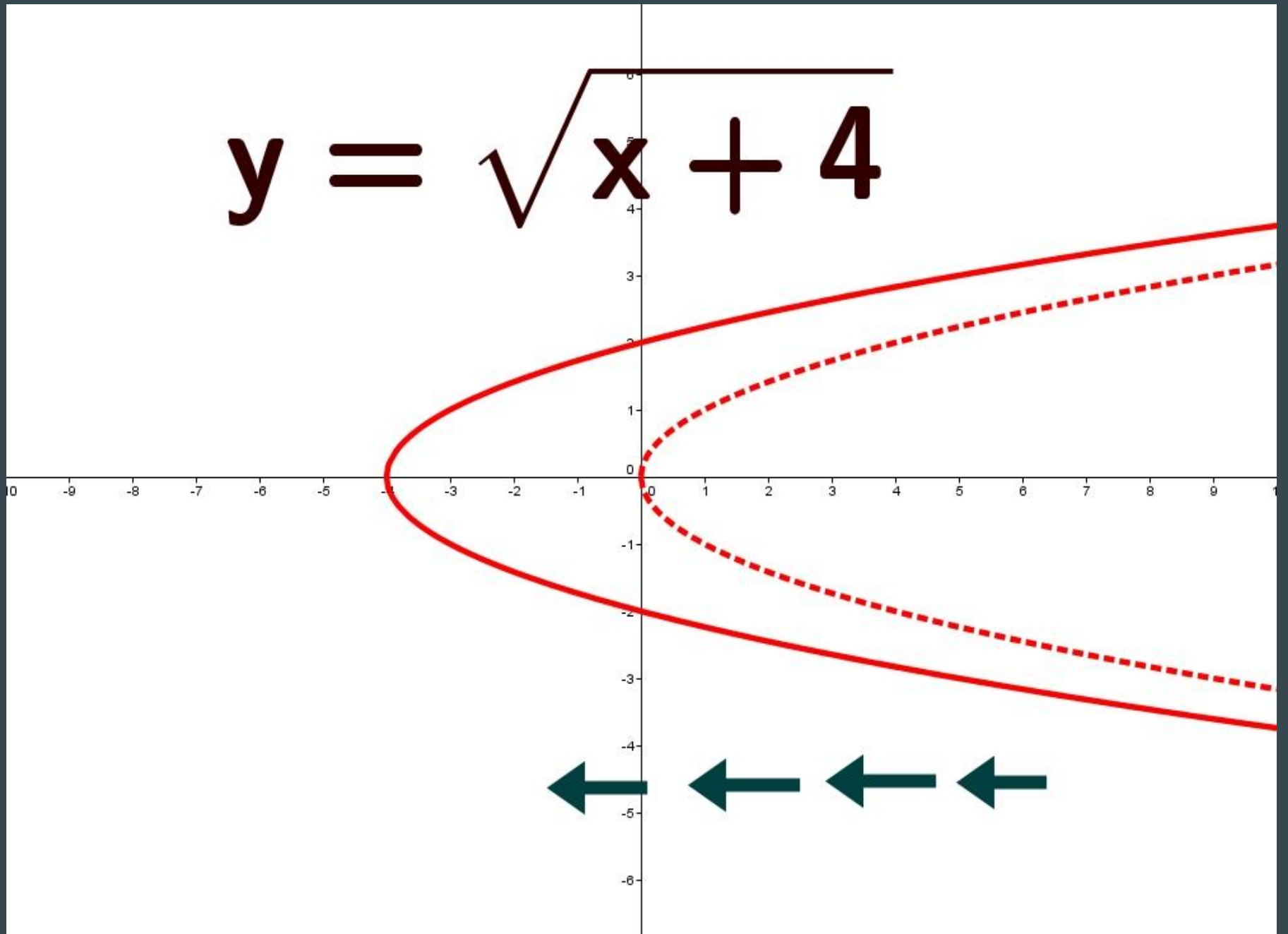
$$y = x^2 - 4$$



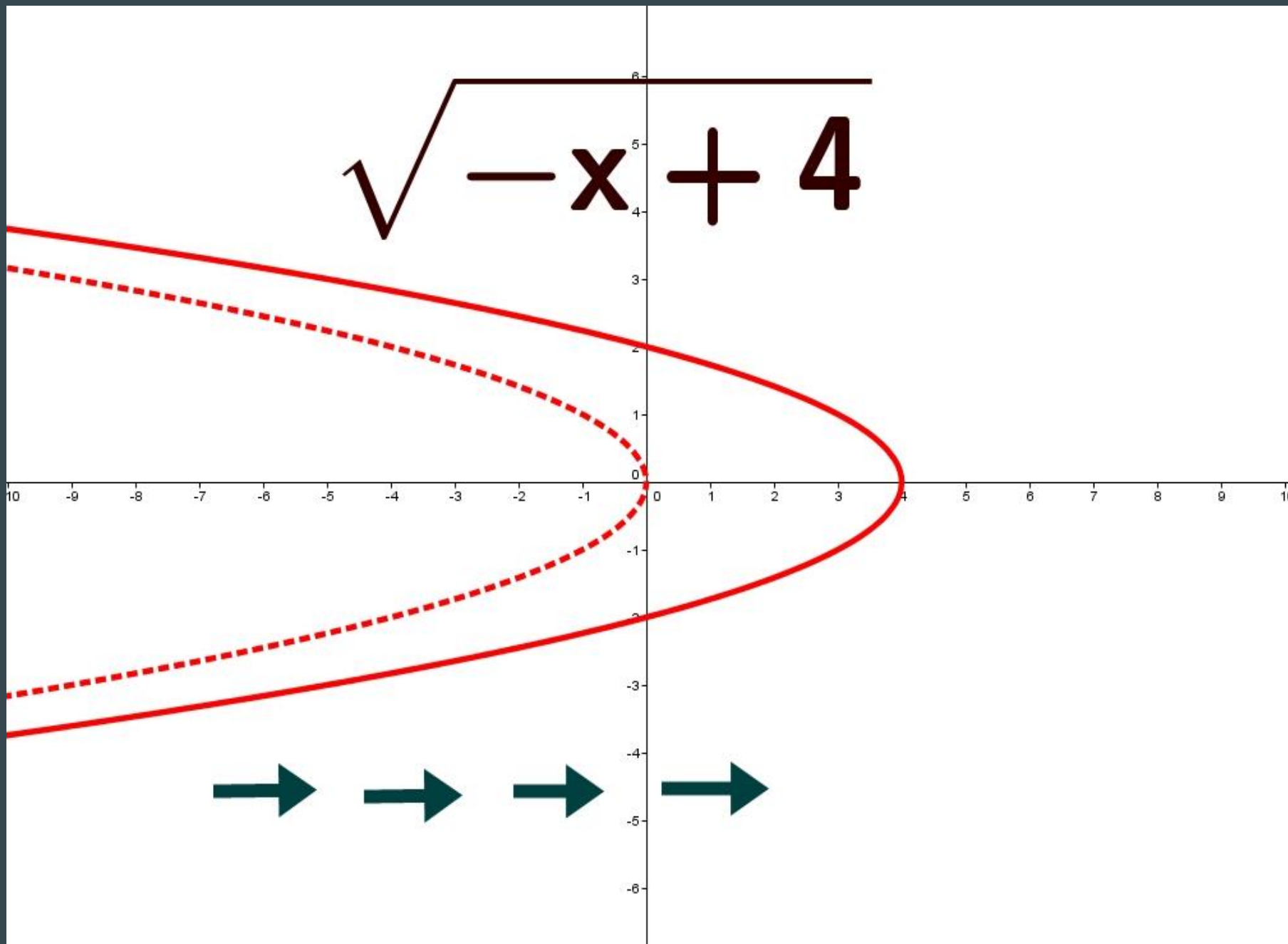
$$y = x^2$$



$$y = \sqrt{x + 4}$$



$$\sqrt{-x + 4}$$



$$y=0$$

$$y=0$$

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

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

$$y=x$$

$$y=x$$

$$y = 2x$$



$$y=0$$

$$y=0$$

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

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

$$y=-x$$

$$y=-x$$

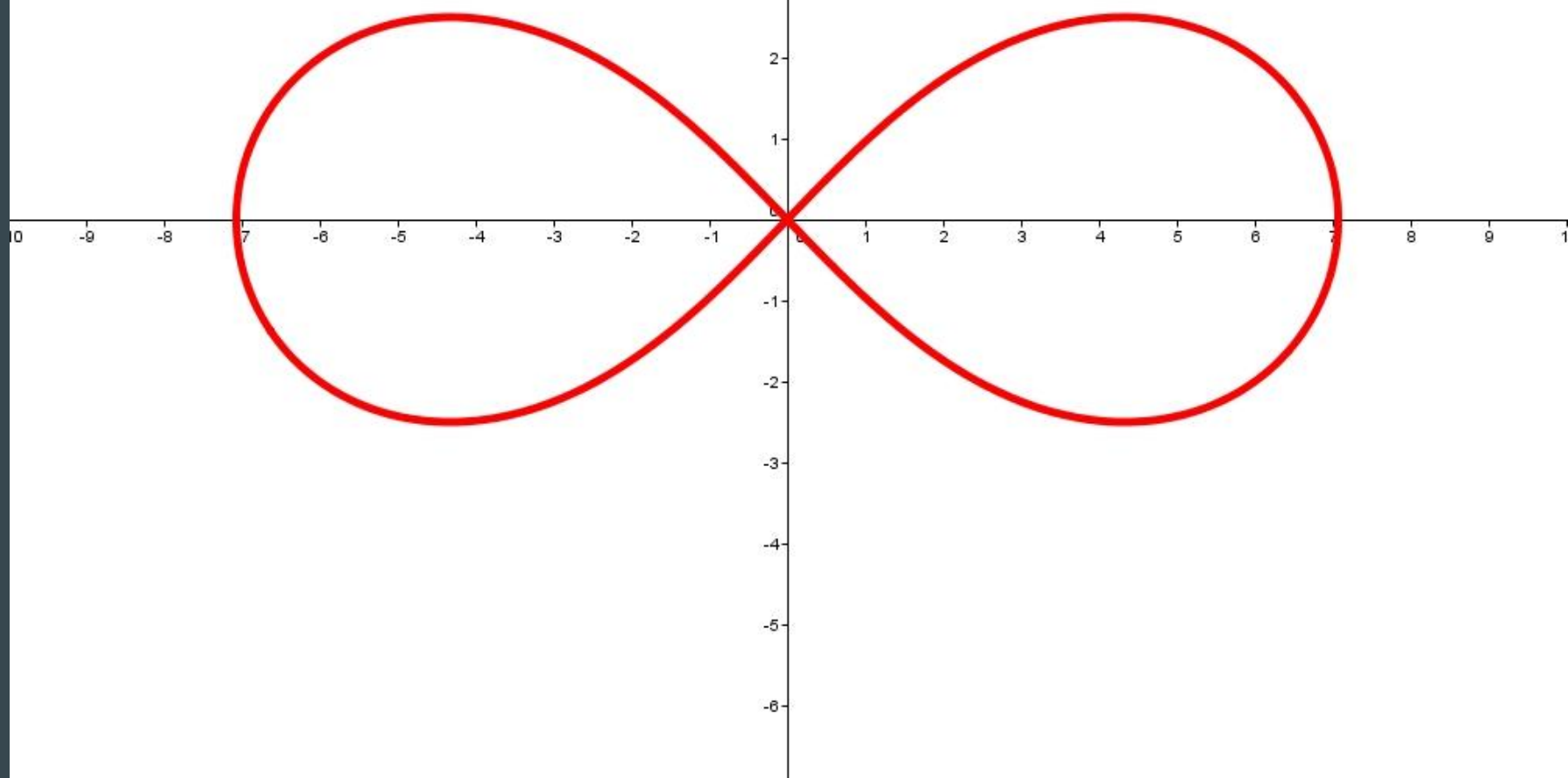
$$y = -2x$$

# *Lesson 3*

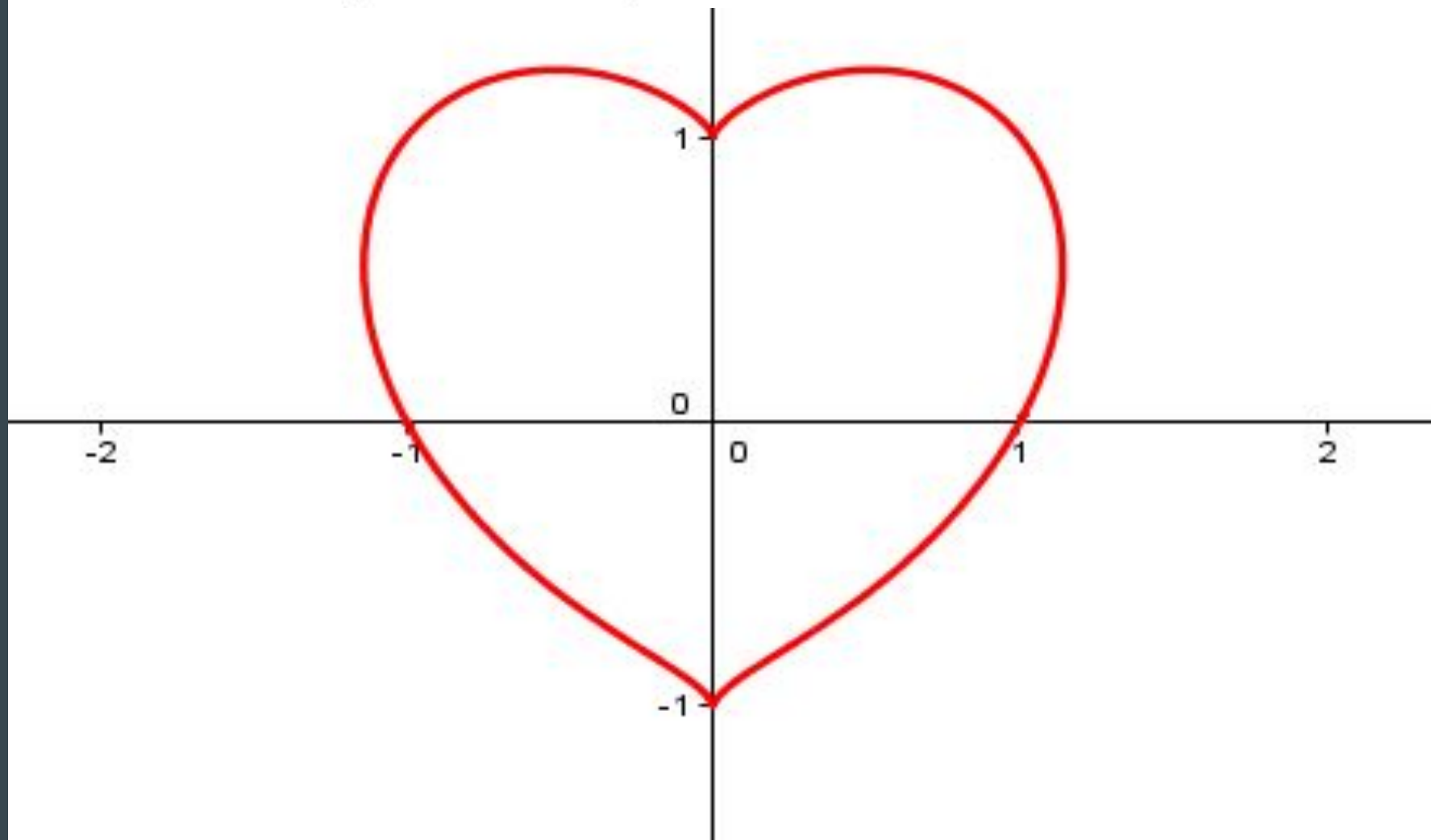
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## **Complex Movements**

$$(x^2 + y^2)^2 = 50(x^2 - y^2)$$



$$(x^2 + y^2)^3 - x^2 y^3 = 0$$



# *Lesson 4*

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**Let's Practice a Bit?**

$$y = x$$

$$y = -x$$

$$y = |x|$$



$$y = -|x|$$

$$y = x^2$$

$$y = -x^2$$

$$y = x^3$$

$$y = -x^3$$

$$y = \sin(x)$$

$$y = \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{x^2}{2}}$$

**WOW!**

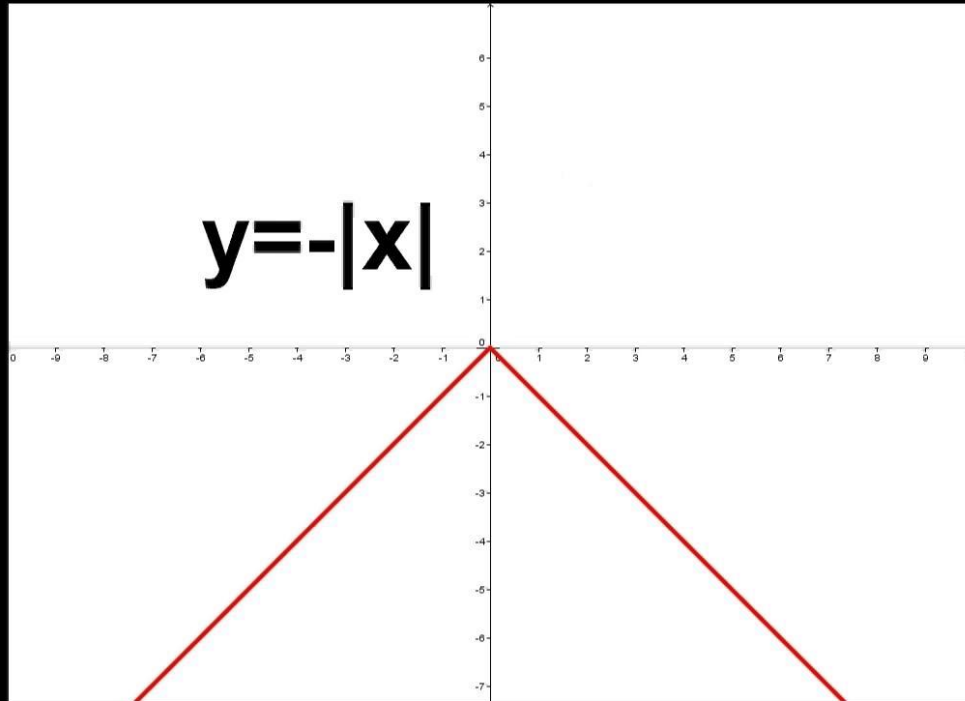


# *Lesson 5*

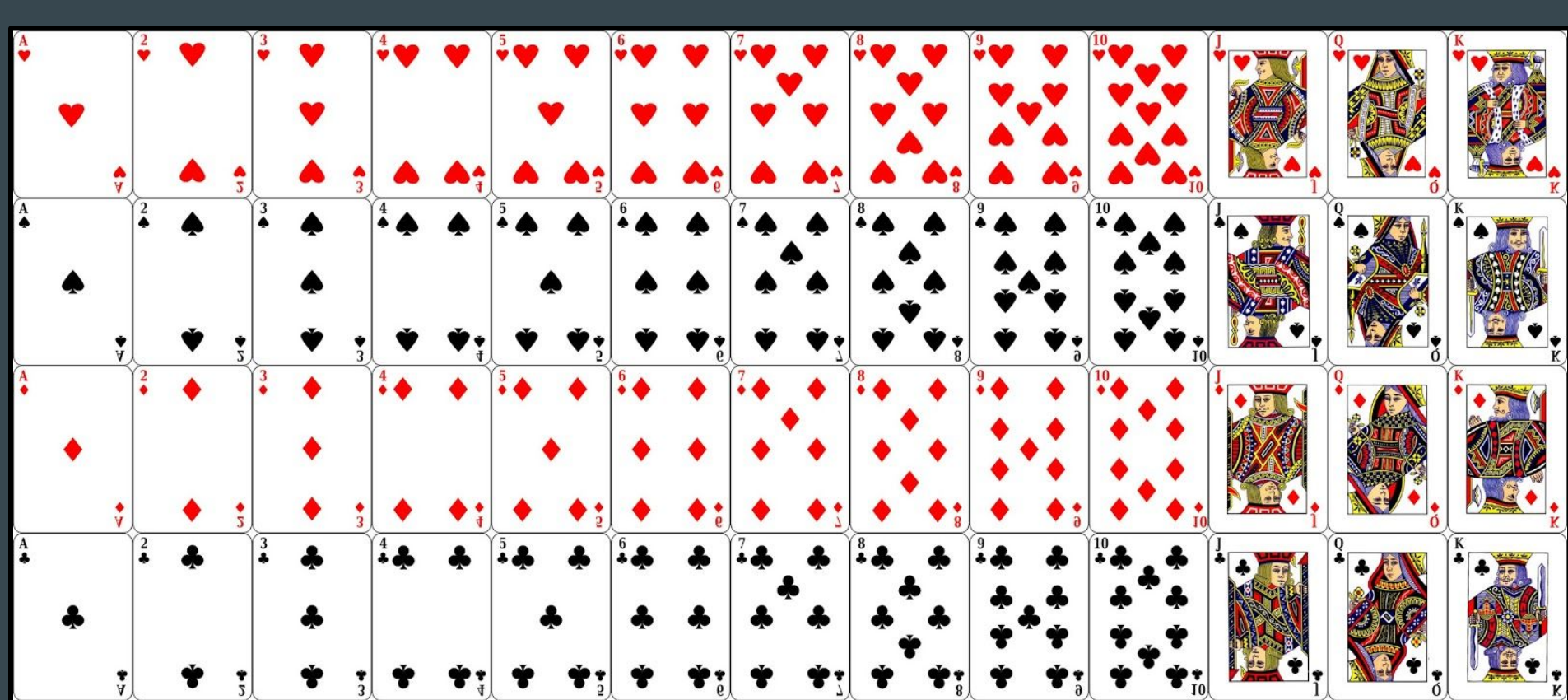
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**LET'S DANCE !!!**

$$y = -|x|$$



# The poker deck



...and for homework



**A SMALL RITUAL**



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**THANK YOU VERY MUCH!**



@MAGIAYMATES



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