

Parabola

Topic: Geometry

Theme: Visualize a parabola by drawing perfectly straight lines (string geometry).

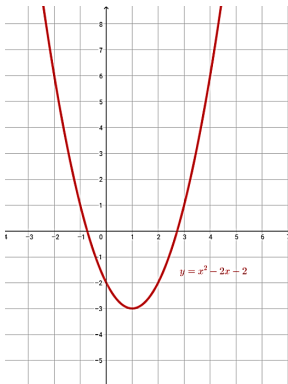
Abilities: Draw, manipulate, realize a curve (parabola). Apply instructions.

Material: A pencil, crayons, 3 sheets of paper, a ruler, a protractor

Level: 1st or 2nd year of school (age 15/16)

Parabola

A parabola is a curve that can be found everywhere around us ; in mathematics (a graph of second polynomial degree ; in analytical geometry as a set of points of a plane that are equally remote from one fixed point and from one fixed line ;as the intersection of a plane and a cone), in physics (path of a projectile). An especially interesting approach to this curve is string geometry. We can find such examples in architecture (construction of bridges).



Parabola in GeoGebra



Stream of water



Jerusalem Chords bridge

Here are two videos explaining the work to be : the first video shows the basic construction of a parabola using a pencil and a ruler; the second video shows two other possibilities of constructing a parabola.

- 1) <https://www.youtube.com/watch?v=xY2U28etO0A>
- 2) <https://www.youtube.com/watch?v=KsWW3fU21Js>

Follow the instructions:

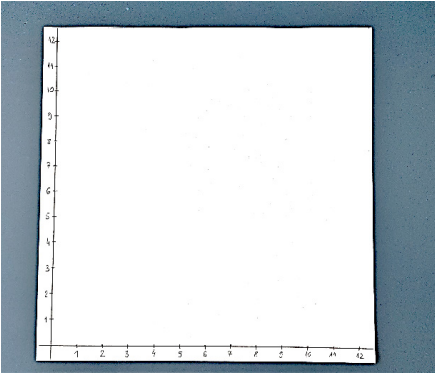


Fig.1

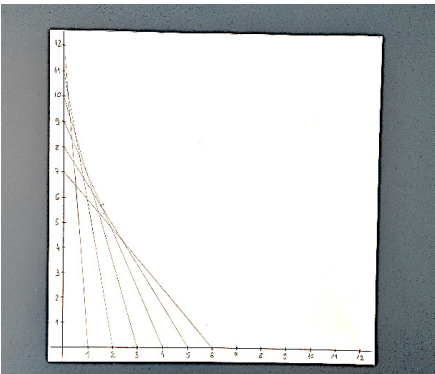


Fig.2

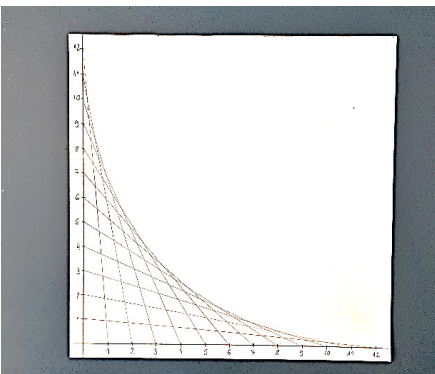


Fig.3

QUESTION 1

- On a sheet of paper draw the first quadrant of the orthonormal coordinate system in a plane, marking the axes from 1 to 12 (See Fig. 1)
- Connect the points of the coordinate axes with line segments so that the sum is 13 (see Fig.2)
- The final result: a parabola (see Fig. 3)

QUESTION 2

Do the same with an axes from an acute angle. What is the final result?

QUESTION 3

Do the same with an axes from an obtuse angle. What is the final result?