

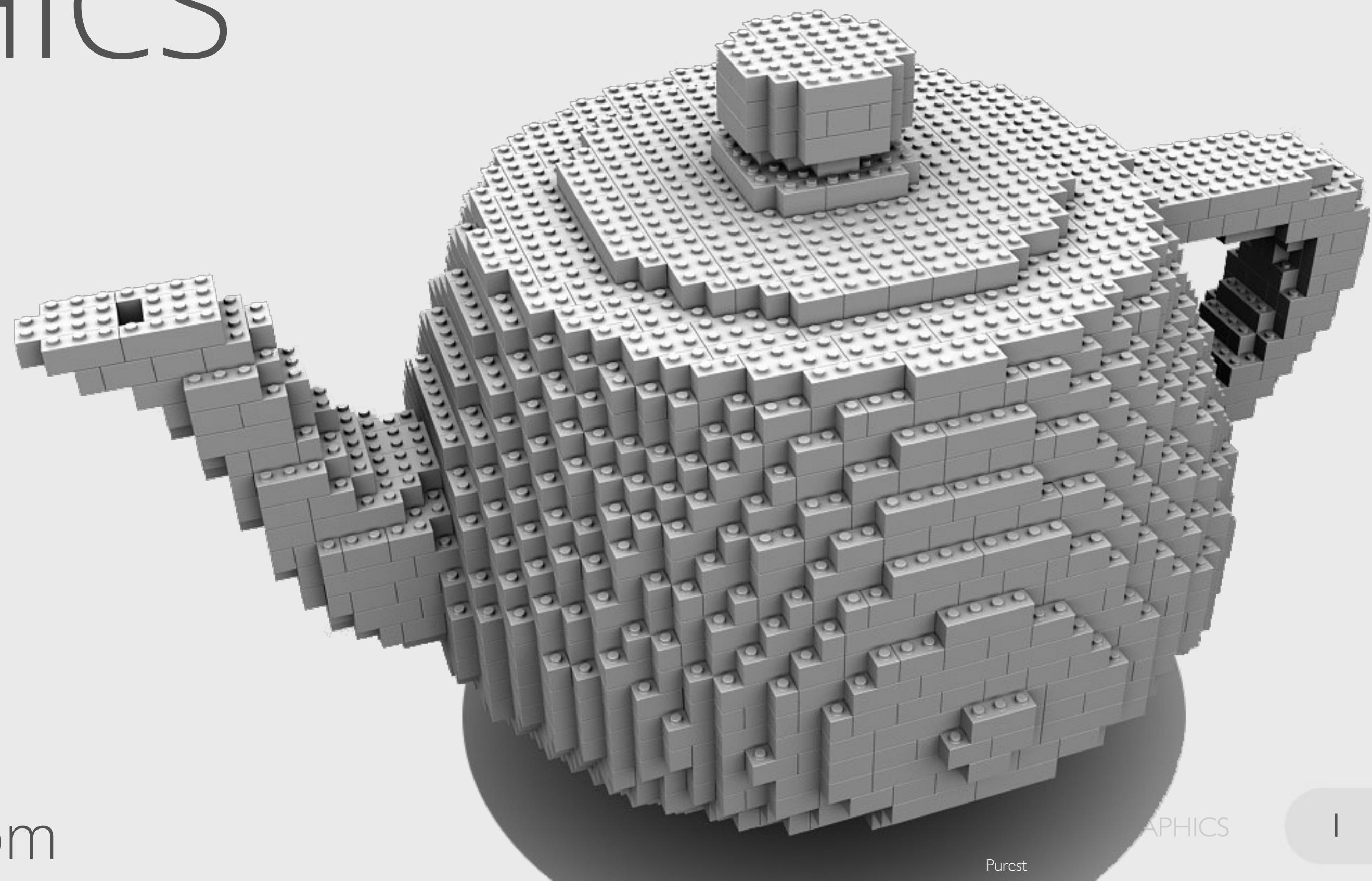


MULTIMEDIA & COMPUTER GRAPHICS

Dr. Arturo Jafet Rodríguez Muñoz

Ing. Bernardo Moya de la Mora

Tuesday & Thursday 04.00pm – 05.30pm

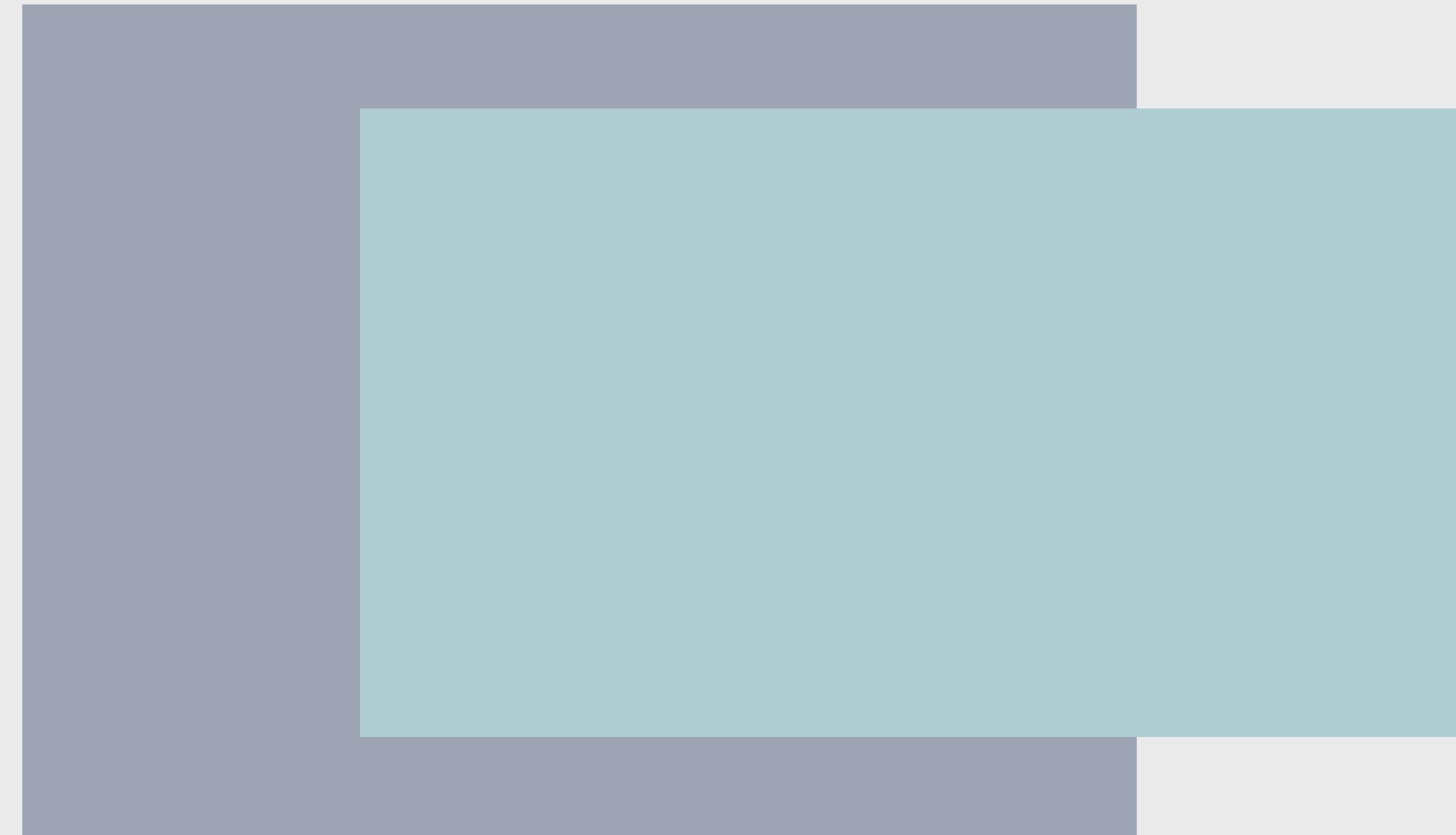


ASPECT RATIO



ASPECT RATIO

800 x 600 → 4:3



1024 x 768 → 4:3

1920 x 1080 → 16:9

1920 x 1200 → 16:10

3840 x 2160 → 16:9



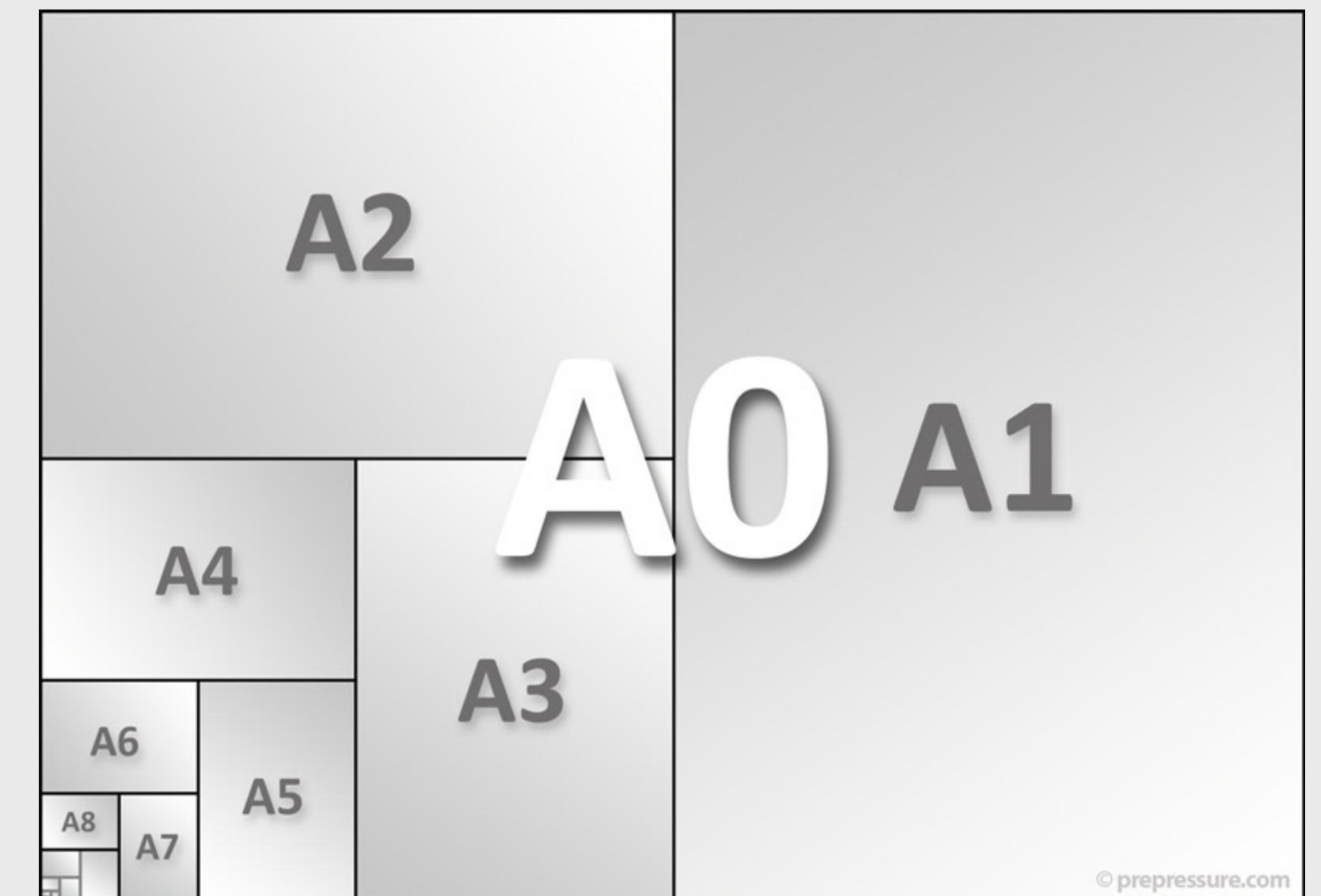
ASPECT RATIO

150 x 150 points 72ppi → 150 x 150 pixels

150 x 150 points 300ppi → 625 x 625 pixels

A4 210 x 297 mm → 595 x 842 points

1: $\sqrt{2}$



ASPECT RATIO



6.7 in / 458ppi
1284 x 2778 pixels



6.0 in / 432ppi
1080 x 2340 pixels



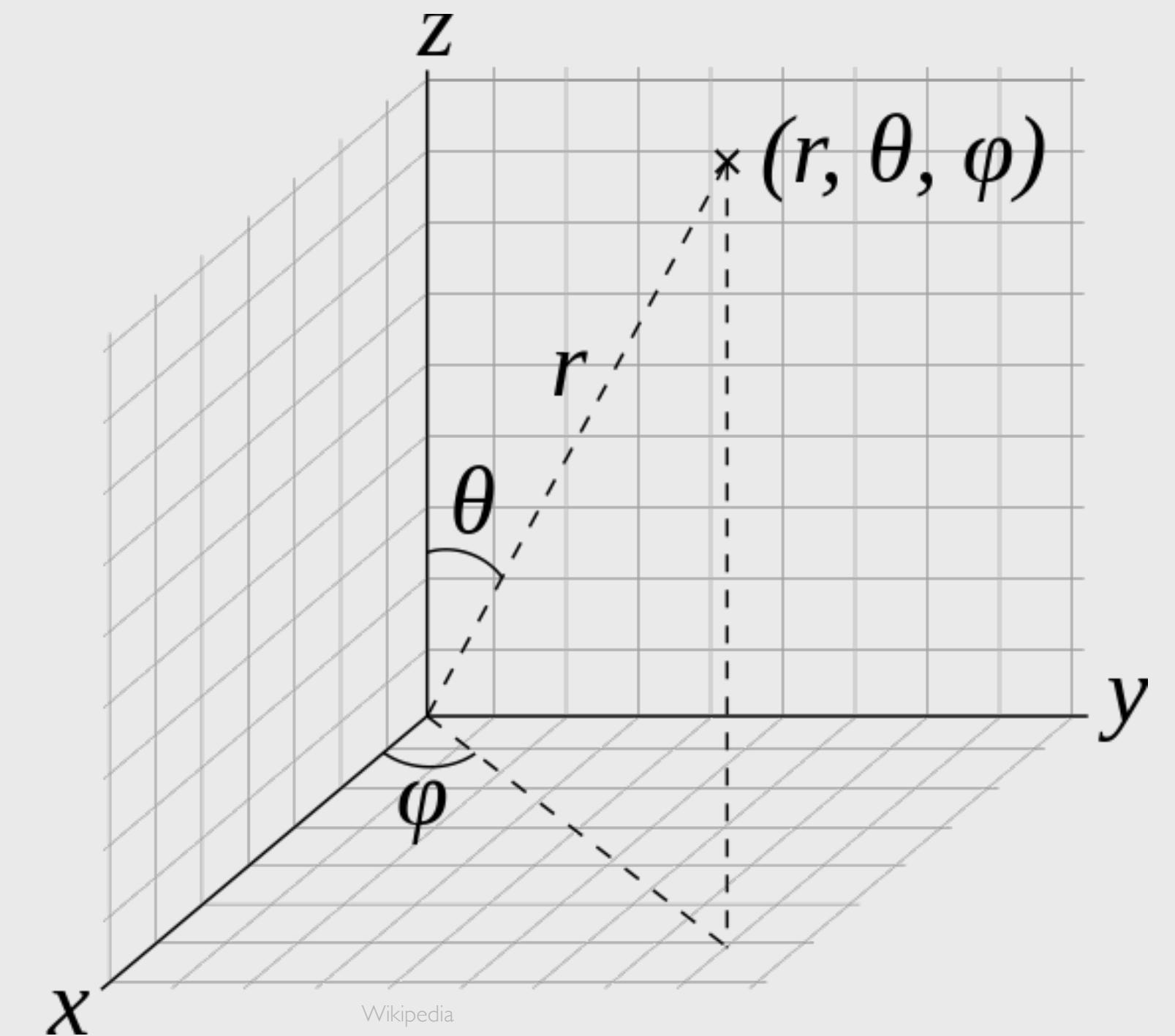
COORDINATE SYSTEM

Geometry

System which uses numbers

Uniquely determine positions

Space (Euclidean, non-Euclidean)



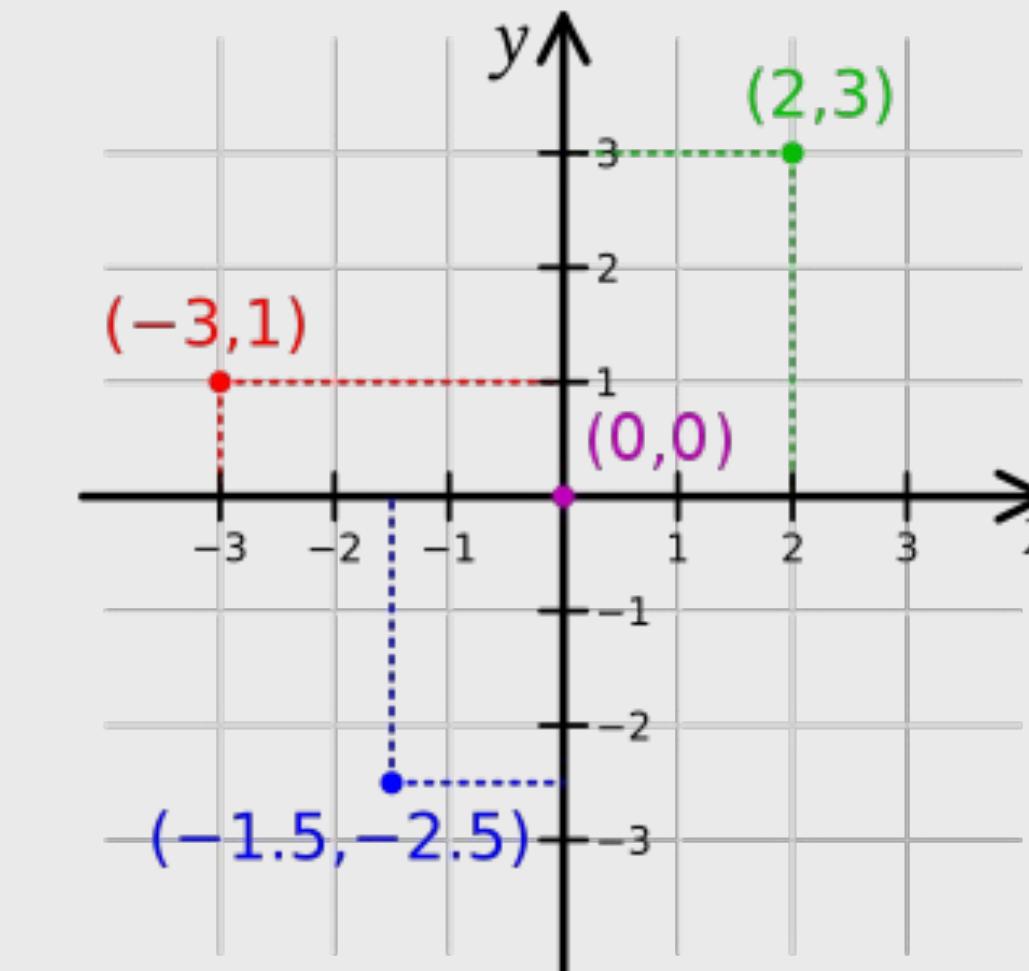
COORDINATE SYSTEM

Cartesian

Plane

$$x + y = 8$$

$$x^2 + y^2 = 16$$



Wikipedia



COORDINATE SYSTEM

1 $\sim \left\{ |x| > 3 : 3\sqrt{-\left(\frac{x}{7}\right)^2 + 1} \right\}$

2 $\sim \left\{ |x| > 4 : -3\sqrt{-\left(\frac{x}{7}\right)^2 + 1} \right\}$

3 $\sim \left| \frac{x}{2} \right| - \frac{3\sqrt{33} - 7}{112} x^2 + \sqrt{1 - (\text{abs}(|x| - 2) - 1)}$

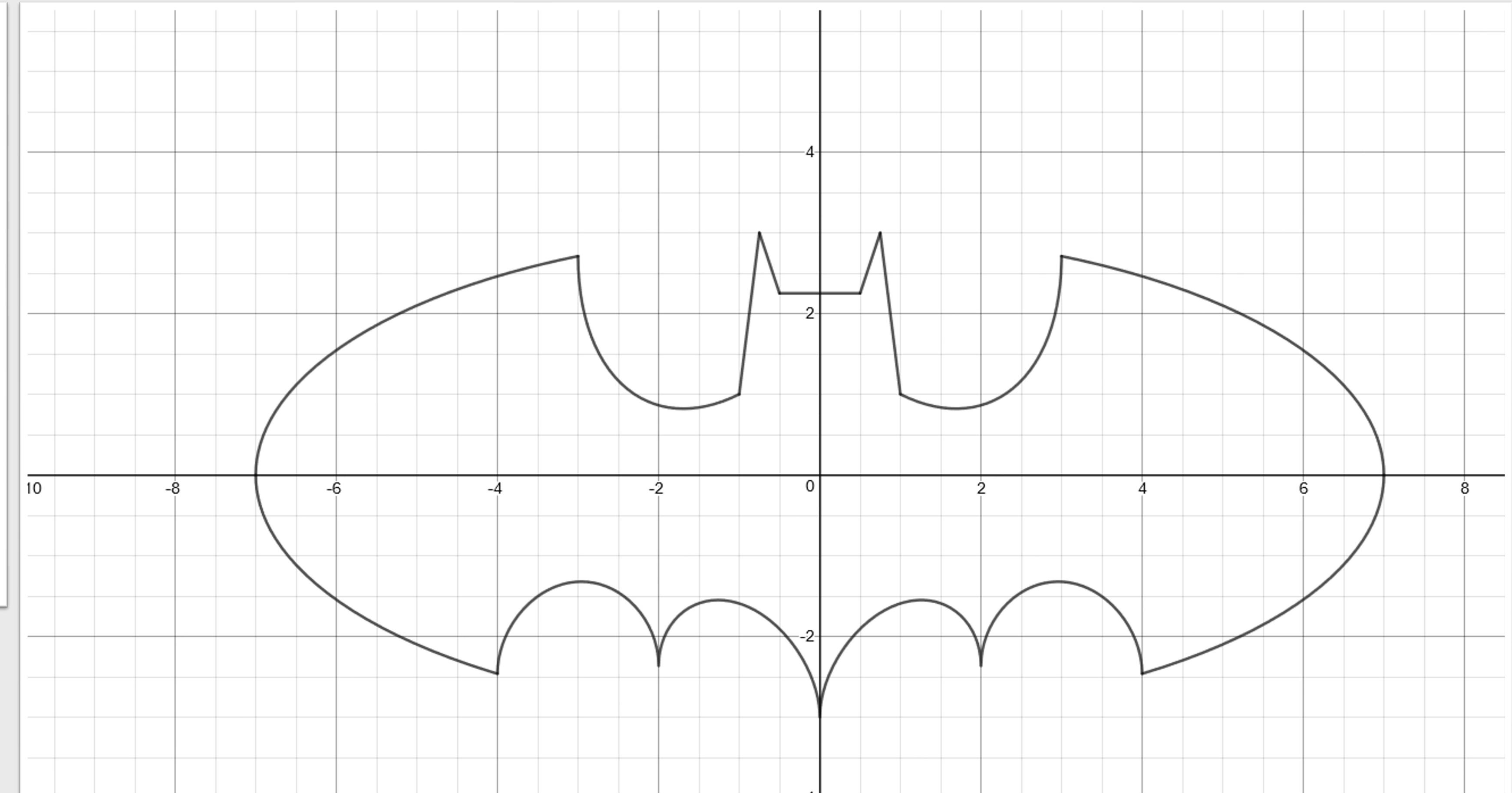
4 $\sim \{ .75 < |x| < 1 : 9 - 8|x| \}$

5 $\sim \{ .5 < |x| < .75 : 3|x| + .75 \}$

6 $\sim \{ |x| < .5 : 2.25 \}$

Desmos

7 $\sim \left\{ |x| > 1 : 1.5 - .5|x| - \frac{6\sqrt{10}}{14} \left(\sqrt{3 - x^2} + 2|x| \right) \right\}$

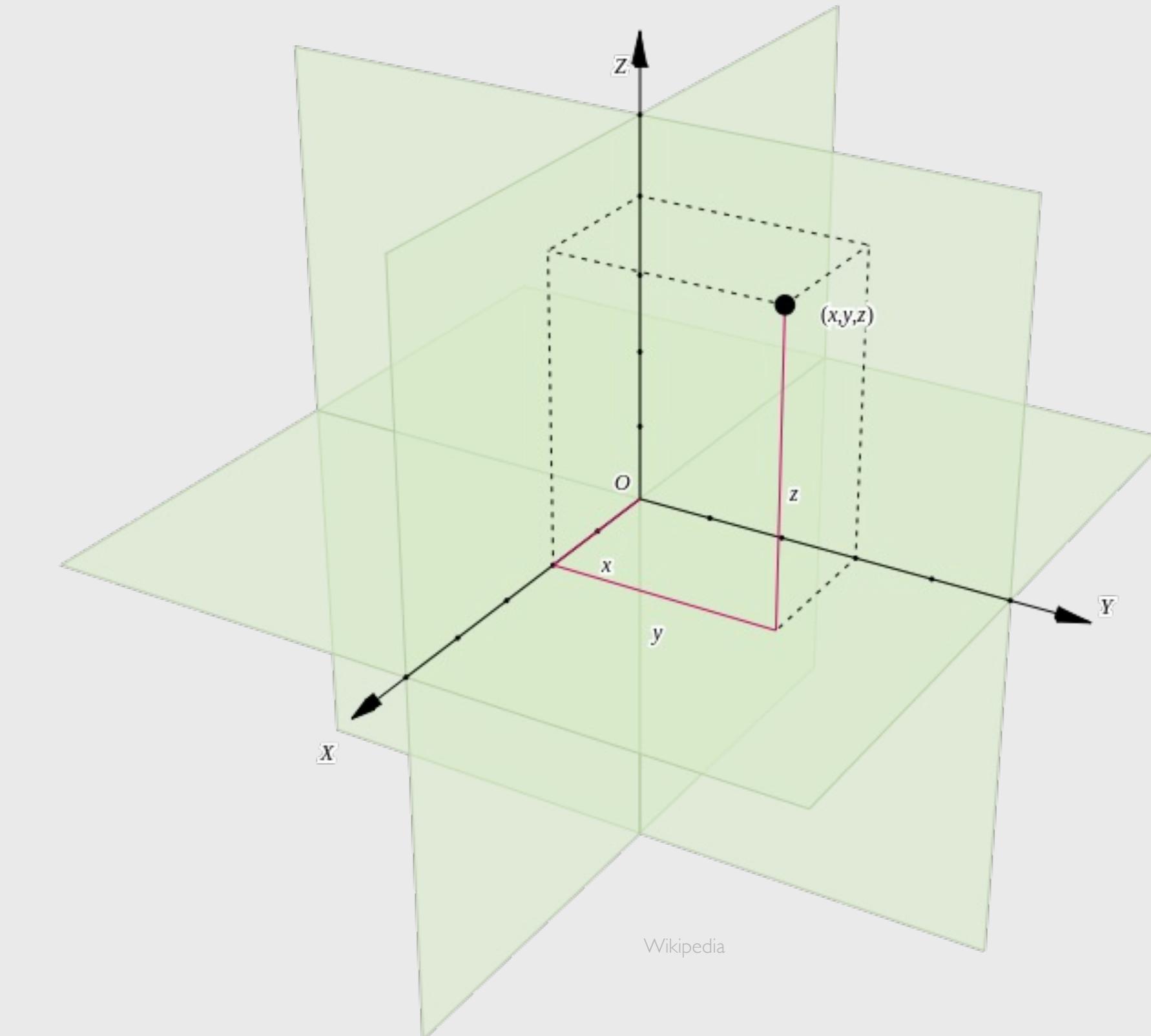


COORDINATE SYSTEM

Cartesian

Plane

x, y, z



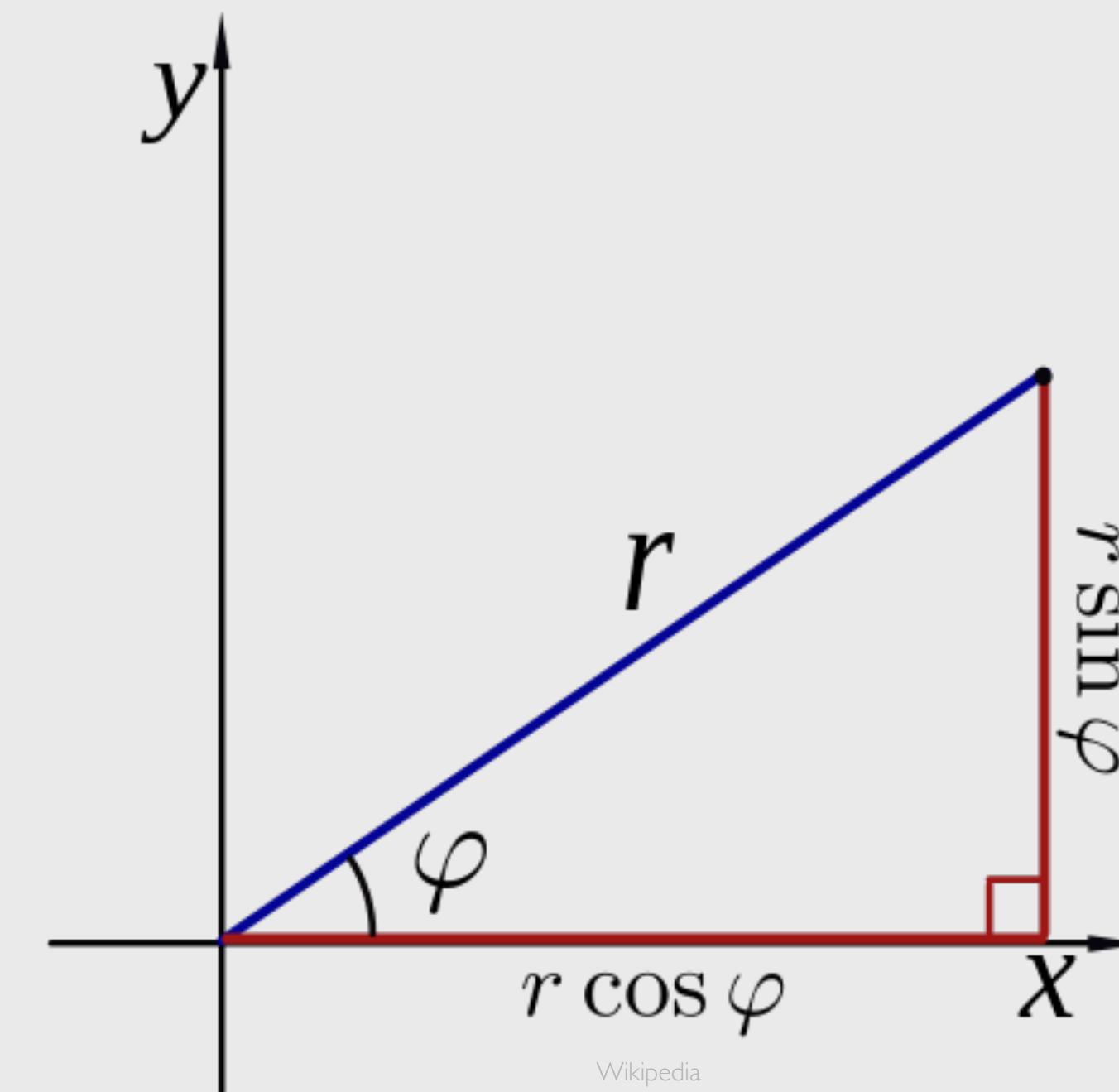
COORDINATE SYSTEM

Polar

Plane

Pole & Polar Axis

Radius & Polar Angle



Wikipedia



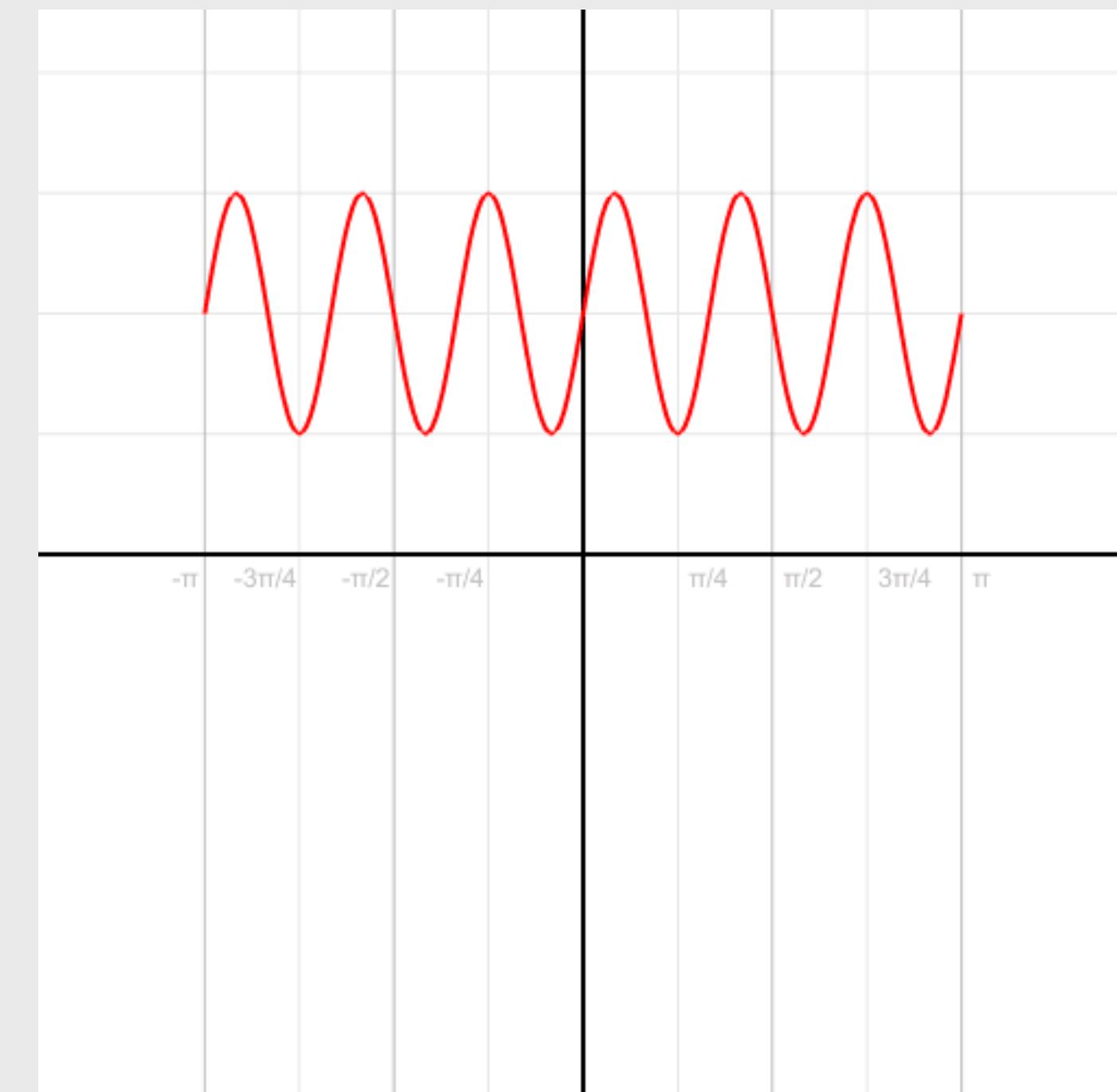
COORDINATE SYSTEM

Polar

Polar to Cartesian

$$x = r \cos(\varphi)$$

$$y = r \sin(\varphi)$$



Wikipedia



COORDINATE SYSTEM

Polar to Cartesian

$$x = r \cos(\varphi)$$

$$y = r \sin(\varphi)$$

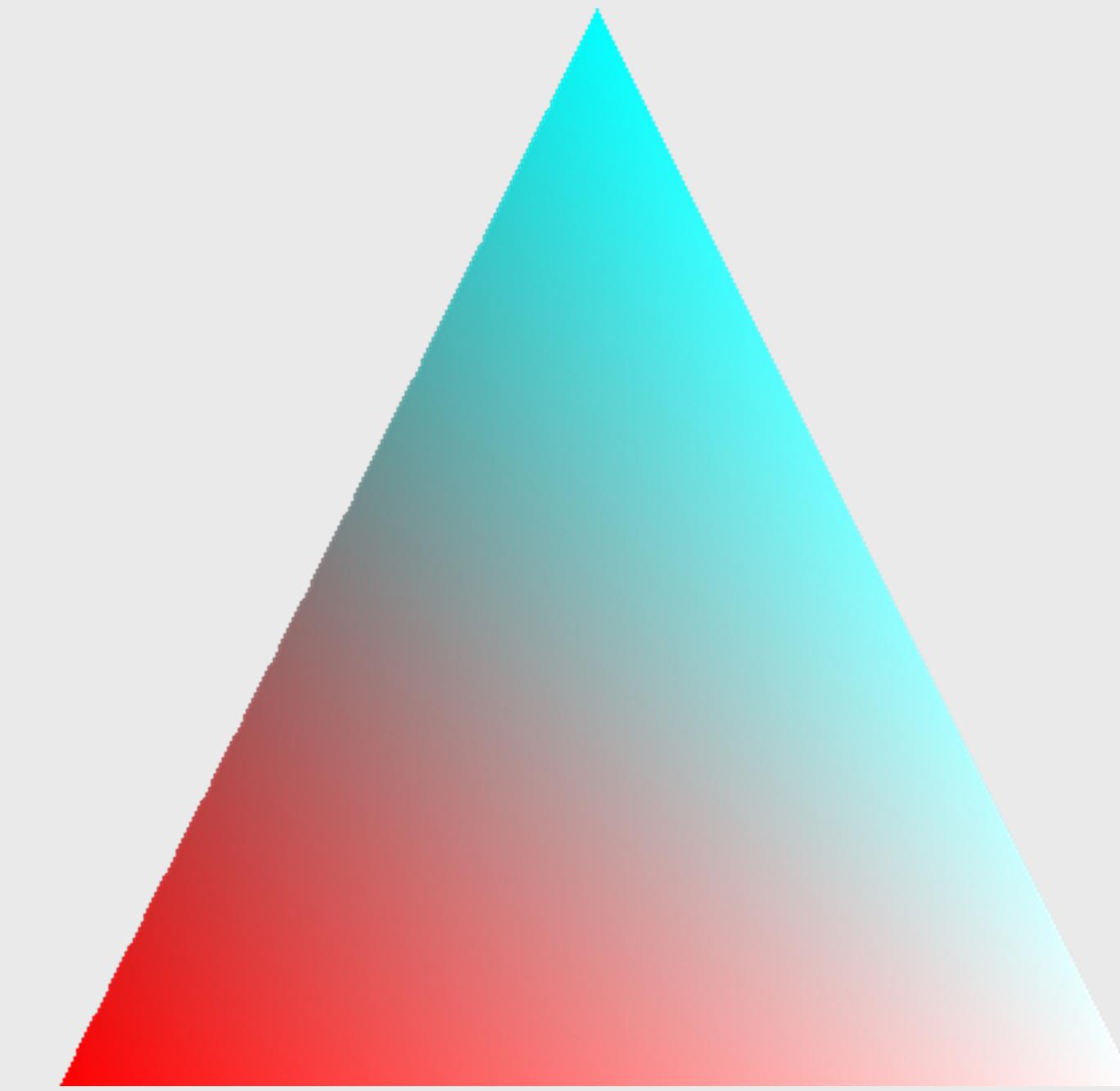
Cartesian to Polar

$r \geq 0$ and ϕ in the interval $(-\pi, \pi]$

$$r = \sqrt{x^2 + y^2} \quad \varphi = \text{atan2}(y, x)$$



IMAGES IN JAVA



HOMEWORK 03

Biography Ivan Sutherland (250 pts)

Biography John Carmack (250 pts)

Create an Aspect Ratio Calculator (412 pts)

Create a Polar-Cartesian and vice versa Calculator (412 pts)



Deadline: Thursday Feb 06, 3.59pm

BIOGRAPHY - IVAN SUTHERLAND



Normal mode (250 pts)

Write a one page biography including most important contributions

Challenge Mode (+0.25x)

Write the report on LaTeX and send PDF and .tex file

BIOGRAPHY – JOHN CARMACK



Normal mode (250 pts)

Write a one page biography including most important contributions

Challenge Mode (+0.25x)

Write the report on LaTeX and send PDF and .tex file

ASPECT RATIO CALCULATOR

Normal mode (412 pts)

Create a program that gets from the user the basic information and the output is the aspect ratio

Auto evaluation - deadlock

It works (200 pts)

The code is understandable (80 pts)

It has documentation (80 pts)

It includes flow diagram or UML diagram (52 pts)



ASPECT RATIO CALCULATOR

Challenge mode (+200 pts)

Include a GUI (+50 pts)

Include that the user can use a file from the computer (+150 pts)



COORDINATE CALCULATOR

Normal mode (412 pts)

Create a program that converts from Polar to Cartesian and Cartesian to Polar Coordinates based on the info supplied by the user

Auto evaluation - deadlock

It works (200 pts)

The code is understandable (80 pts)

It has documentation (80 pts)

It includes flow diagram or UML diagram (52 pts)



COORDINATE CALCULATOR

Challenge mode (+200 pts)

Include a GUI (+50 pts)

Include that the user can see the graph and test it with the following equation named 'Polar rose' $r(\varphi) = a \cos(k\varphi + \gamma_0)$ k has to be an integer so it looks correct (+150 pts)



REFLECTION

