

What form do these architectural works have in common?

Amphitheatrum Flavio (Colosseum), 80 A.D. Roma

One of the 7 wonders
of the modern world

The most visited
monument in Italy



St Peter's square in Vatican City, 1667
designed by Bernini Roma
It symbolizes the universal embrace of the Church



Barberini Palace 1633-1634, Rome designed by Borromini

Prototype of the baroque palace, it was conceived as the culmination of the rise of a papal family



Duomo of Santa Maria Assunta 1092, Pisa

Elliptical dome frescoed with the Virgin in glory and saint by Orazio Riminaldi





Ellipse

What form do these architectural works have in common?

Gateway Arch 1965, Missouri designed by Saarinen



Tallest national monument
in America



Bridge of Alexandria's Citadel, 2016 designed by Meier

Connects City of Alexandria with
the fortified citadel of XVIII century



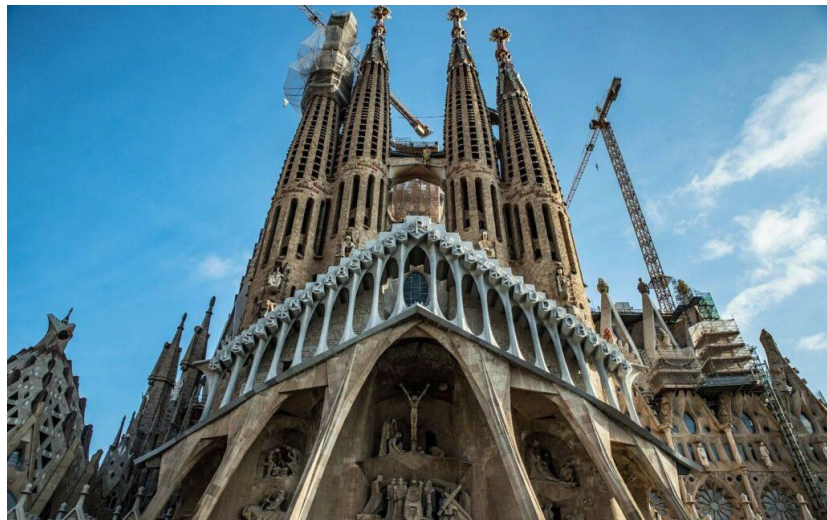
Paraboloid silo ex Montecatini, 1956 designed by Nervi Porto Recanati

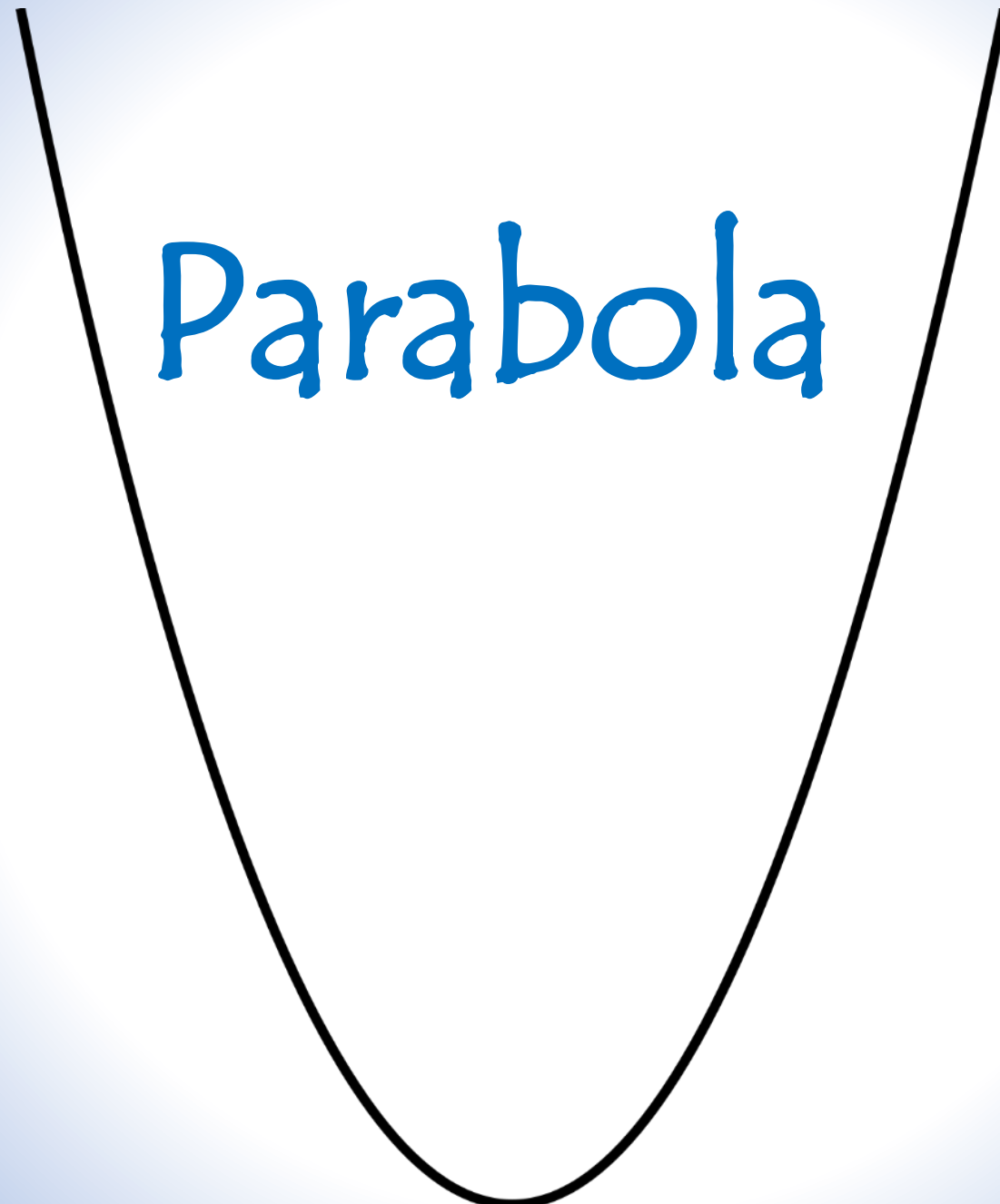
Document of industrial archaeology, building dedicated to sorting and shipping of goods



Sagrada Familia, Casa Milà 1907 e attico casa Battlò 1913, Gaudì, Barcelona

“Straight is the line of men, that curve the line of God”. Gaudì





Parabola

What form do these architectural works have in common?

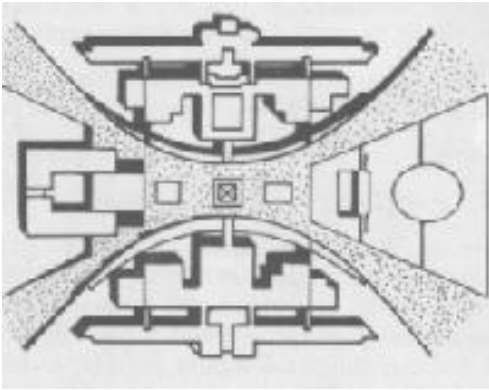


Palace of the Lazio Region, 1965
designed by Pacini
Modernist style



Australian Parliament House of Canberra 1988, designed by Romaldo Giurgola

One of the most famous parliament house in the world. Grand and open building
symbolically and not only



Tower Azadi 1971, Teheran designed by Hossein Amanat

The word Azadi means freedom in Persian.

It combines artfully modern architecture with traditional Iranian influences

It is one of the visual icons of Tehran



Cathedral of Brasilia 1970, designed by Niemeyer

The top part of multi-pointed has a symbolic function as if it to recall Queen of Heaven's crown and the Christ's crown of thorns





Hyperbola

What form do these architectural
works have in common?

This is too easy!

Infinite Bridge Aarhus 2015, designed by Niels Povlsgaard and Johan Gjødes

The structure has a diameter of 60 m, suspended about 2 m above water surface. It is located halfway between the beach and the sea



Guangzhou Circle Mansion 2013, designed by Di Pasquale

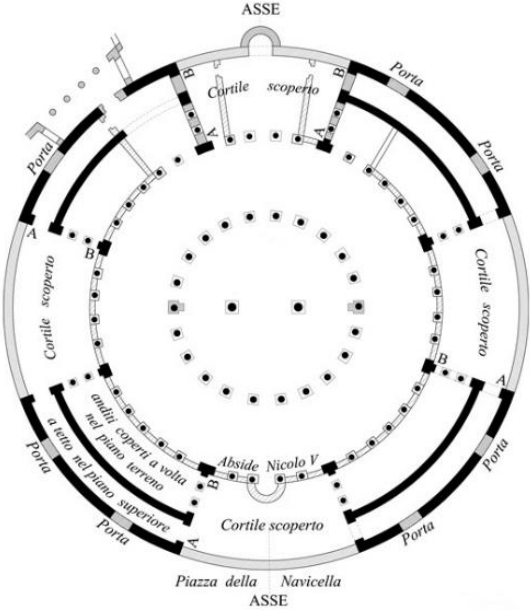
It is the tallest circular building in the world with the unique feature of an empty hole in the center – also perfectly circular – with a diameter of 48 m

The world's largest trading centre for plastic material



Basilica of Saint Stephen Round V century, Rome

One of the most ancient paleochristian church. Its plan symbolizes totality and harmony call of cosmic wonder and order of creation



Castle of Qasr al-Haj XIII century, Lybia

It is the most wonderful piece of Berber architecture in Libya, originally used to store the local produce such as olive oil (in clay jars), and grains

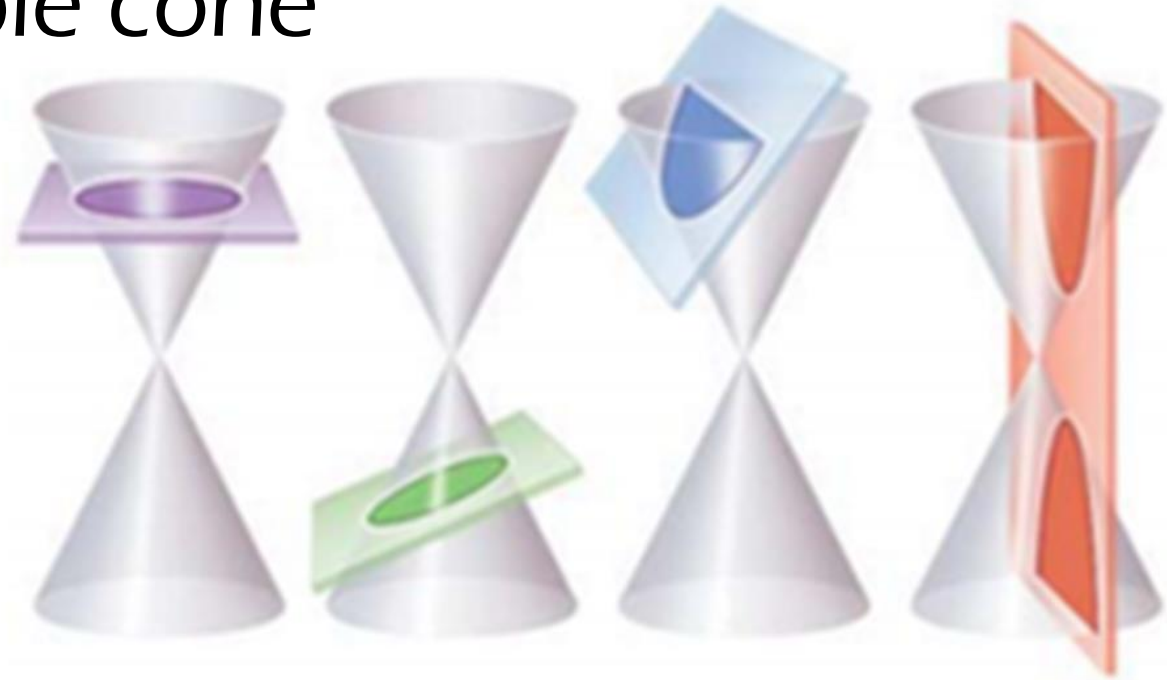




Circle

A conic sections is the curve that results when a plane intersects a double cone

- Circle
 - Ellipse
 - Parabola
 - Hyperbole
- are called



Circle

Ellipse

Parabola

Hyperbola



CONIC

GENERAL EQUATION FOR CONIC

$$Ax^2 + Cy^2 + Dx + Ey + F = 0$$

Conic Section

Circle

Ellipse

Parabola

Hyperbola

Characteristic

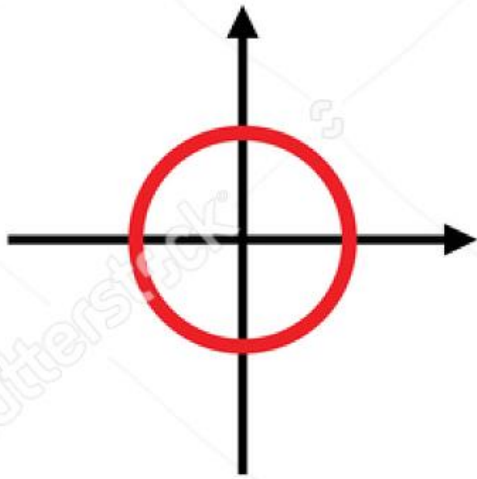
$$A = C \neq 0$$

$$A \neq C, AC > 0$$

Either $A = 0$ or $C = 0$, but not both

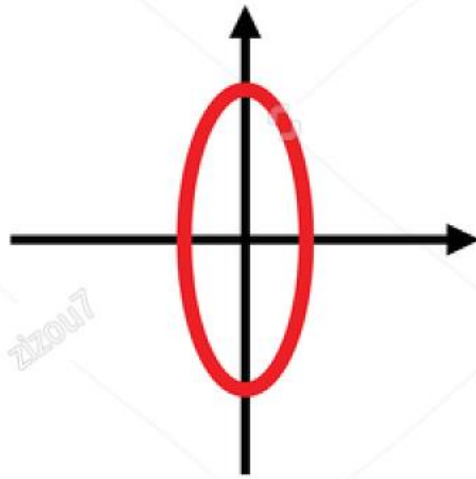
$$AC < 0$$

Conic Sections



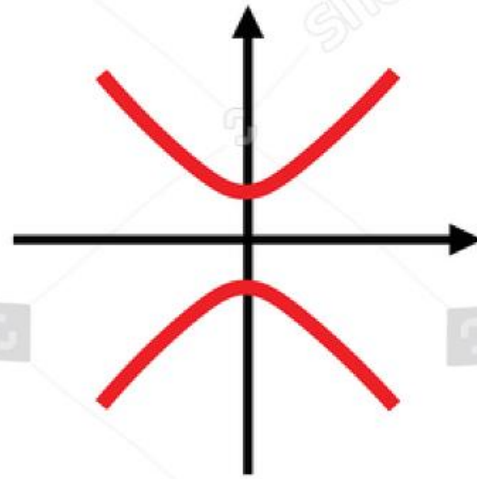
$$(x-h)^2 + (y-k)^2 = R^2$$

Circle



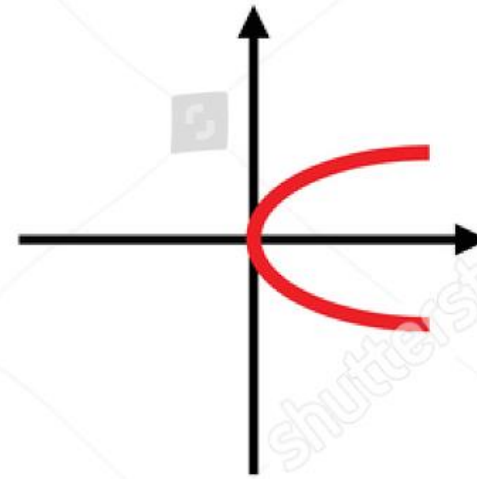
$$\frac{(x-h)^2}{a^2} + \frac{(y-k)^2}{b^2} = 1$$

Ellipse



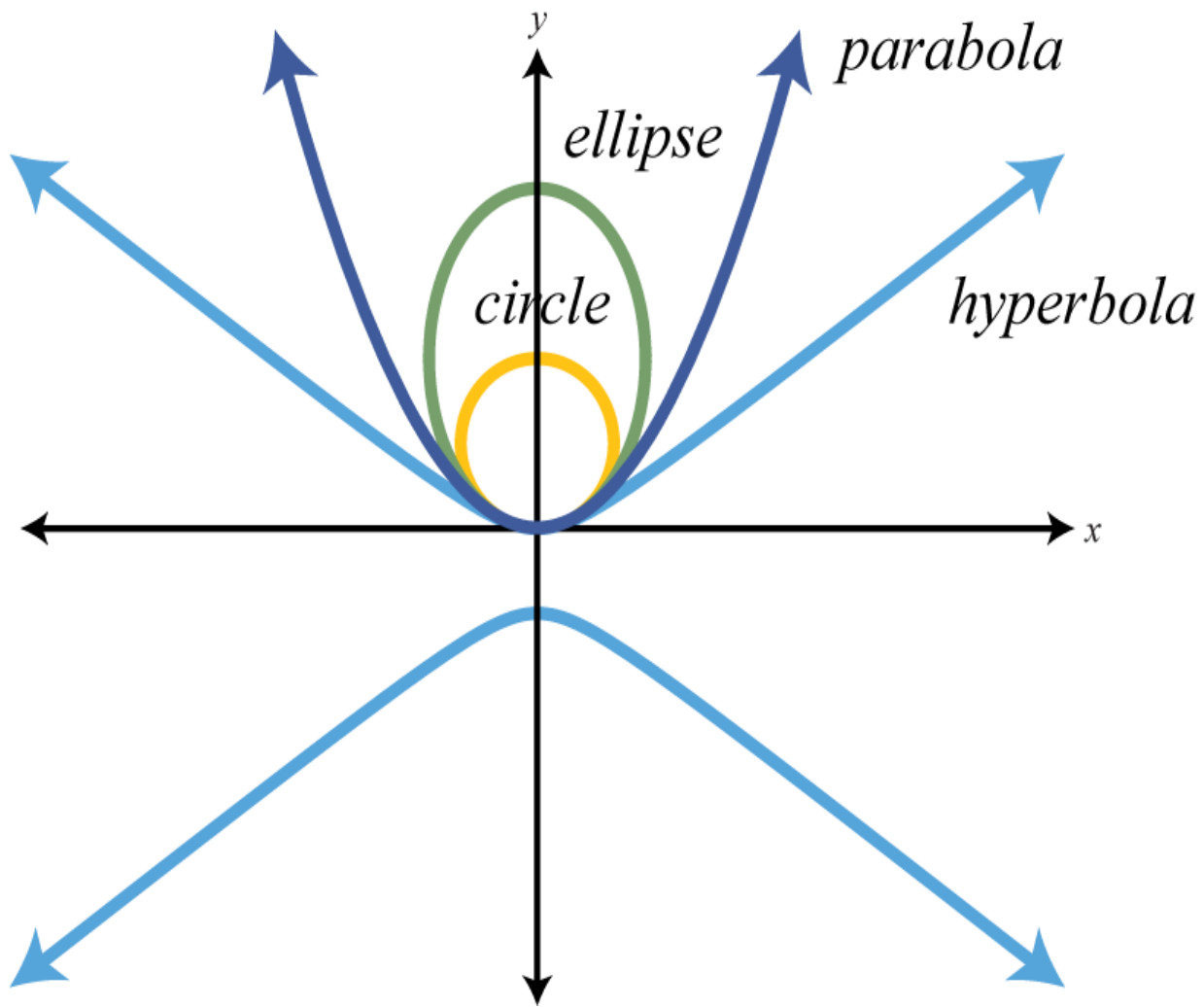
$$\frac{(x-h)^2}{a^2} - \frac{(y-k)^2}{b^2} = 1$$

Hyperbola



$$(y-k)^2 = 4p(x-h)$$

Parabola



CURIOSITY: etymology

- **ELLIPSE**: comes from the Greek *ēlleipsis* and means lack
- **PARABOLA**: comes from the Greek *parabāllein* and means place next, in parallel
- **HYPERBOLE**: comes from the Greek *hyperbāllein* and means throw over

Terms used for the first time by Apollonio

CURIOSITY: foci of conic

There is no doubt that Archimedes was a great inventor, and the death ray is no exception. This parabolic mirrored structure was used to concentrate sunlight over a particular area on a ship which would then catch **fire**, ultimately leading to the sinking of the ship. The concept was again developed as a defensive mechanism for his city of Syracuse. By catching fire to enemy ships, they were able to defeat the faceless Roman army during battle in 212 B.C.

Solar oven



Video o attività laboratoriale per la
costruzione

Historical excursus of conic in the architecture

One of the first conic used in architecture was the circle and most widely used for millennia. Since ancient time are found architectural structures with a circular plan for religious, funerary and astronomic purpose L'ELLISSE, INVECE, È STATA UTILIZZATA PER POCHI TIPI DI COSTRUZIONE, SOLITAMENTE DI GRANDE IMPORTANZA, E SOLO IN ALCUNI PERIODI.

NELL'ARCHITETTURA DI ROMA ANTICA, AD ESEMPIO, SI UTILIZZA LA PIANTA ELLITTICA PER LA REALIZZAZIONE DEGLI ANFITEATRI.

IN ETÀ MEDIEVALE E RINASCIMENTALE IL RICORSO ALLE GEOMETRIE ELLITTICHE FU MOLTO LIMITATO ECCETTO CHE PER LA REALIZZAZIONE DI ALCUNE PIAZZE A PIANTA ELLITTICA SU PREESISTENTI ANFITEATRI ROMANI.

L'USO DELLA FORMA CIRCOLARE RIMANE, TUTTAVIA, PREVALENTE RISPETTO A QUELLO DI ALTRE CONICHE FINO ALLA FINE DEL MEDIOEVO, ANCHE PER VIA DEL SIGNIFICATO SIMBOLICO FILOSOFICO-RELIGIOSO ATTRIBUITO AL CERCHIO

PER UN MAGGIOR IMPIEGO DELLA FORMA ELLITTICA BISOGNA ARRIVARE AL PERIODO BAROCCO, TRA '600 E '700: FU UTILIZZATA IN ARCHITETTURA, IN URBANISTICA, NELLA PRODUZIONE DI MOBILI, OGGETTI E CERAMICHE. IN GENERALE LO STILE BAROCCO PRIVILEGIA L'UTILIZZO DELLA LINEA CURVA

L'ELLISSE APPARE COME UNA FORMA PIÙ DINAMICA DEL CERCHIO PERCHÉ CREA UNA TENSIONE DIREZIONALE CHE LA PIANTA CIRCOLARE NON PERMETTE

L'IMPIEGO DI ALTRE FORME CONICHE, COME PARABOLA ED IPERBOLE, E' SUCCESSIVO ED È TIPICO SOPRATTUTTO

DELL'EPOCA CONTEMPORANEA LA PARABOLA E L'IPERBOLE, INFATTI, SI ESTENDONO GEOMETRICAMENTE ALL'INFINITO, A

DIFFERENZA DELL'ELLISSE CHE, PUR NON AVENDO UNA FORMA "RIGIDA", RACCHIUDE UNO SPAZIO FINITO.

SONO QUINDI LA PARABOLE E L'IPERBOLE LE CONICHE CHE MEGLIO RISPECCHIANO LE TENDENZE DELL'EPOCA

MODERNA, PRESTANDOSI A RAPPRESENTARE UNO SPAZIO LIBERO, CHE PROIETTA LA MENTE VERSO L'INFINITO.

