L'analisi geometrico-figurativa
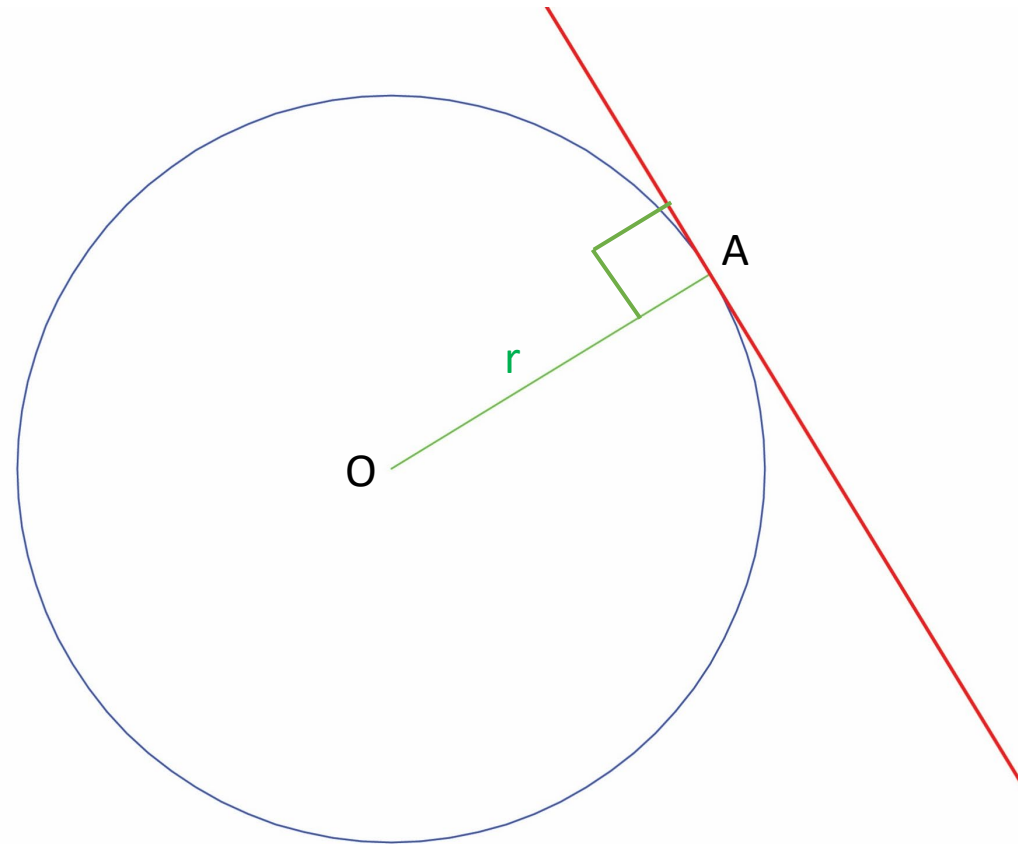
Corso di Strumenti e tecniche per il disegno e la comunicazione

condotto da Daniele Colistra

Lezione n. 3 del 4 ottobre 2022

Costruzione della una tangente nel punto A della circonferenza

Si conduce il raggio in A e si costruisce la perpendicolare al raggio in detto punto. Quest'ultima è anche la tangente alla circonferenza nel punto A.
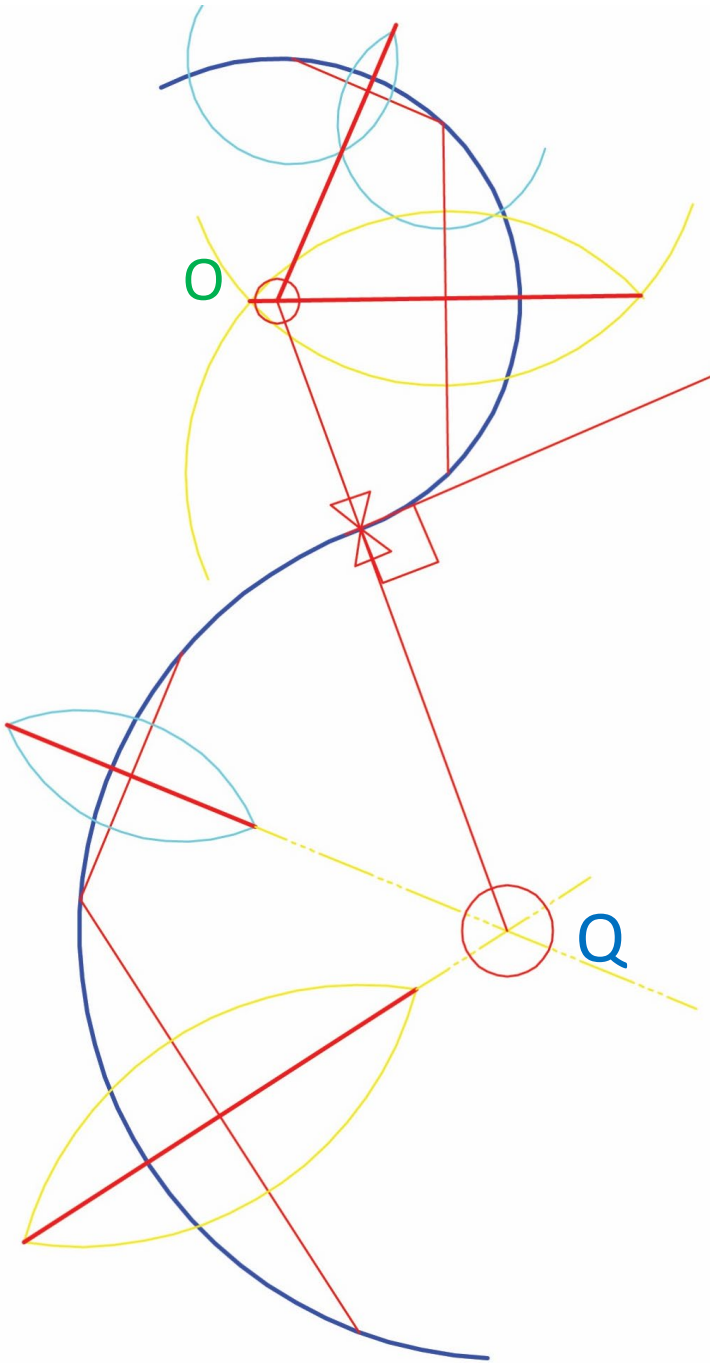
Individuare il centro di un arco di circonferenza

Dato un arco di circonferenza, segnato in verde, trovare il centro O. Staccare tre punti sulla circonferenza (A B e C) e costruire gli assi dei due segmenti. Il centro della circonferenza O sarà individuato dall'intersezione dei due assi.
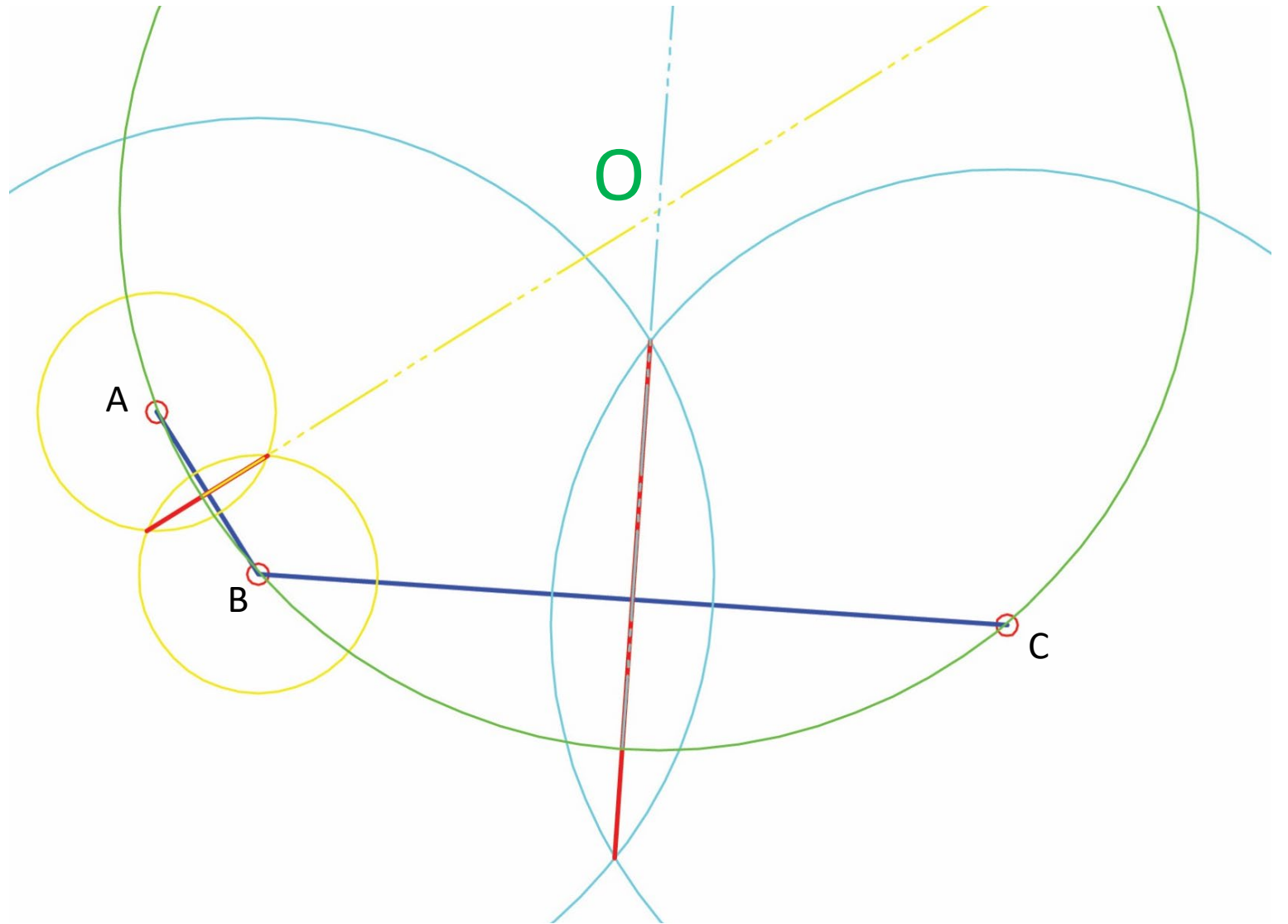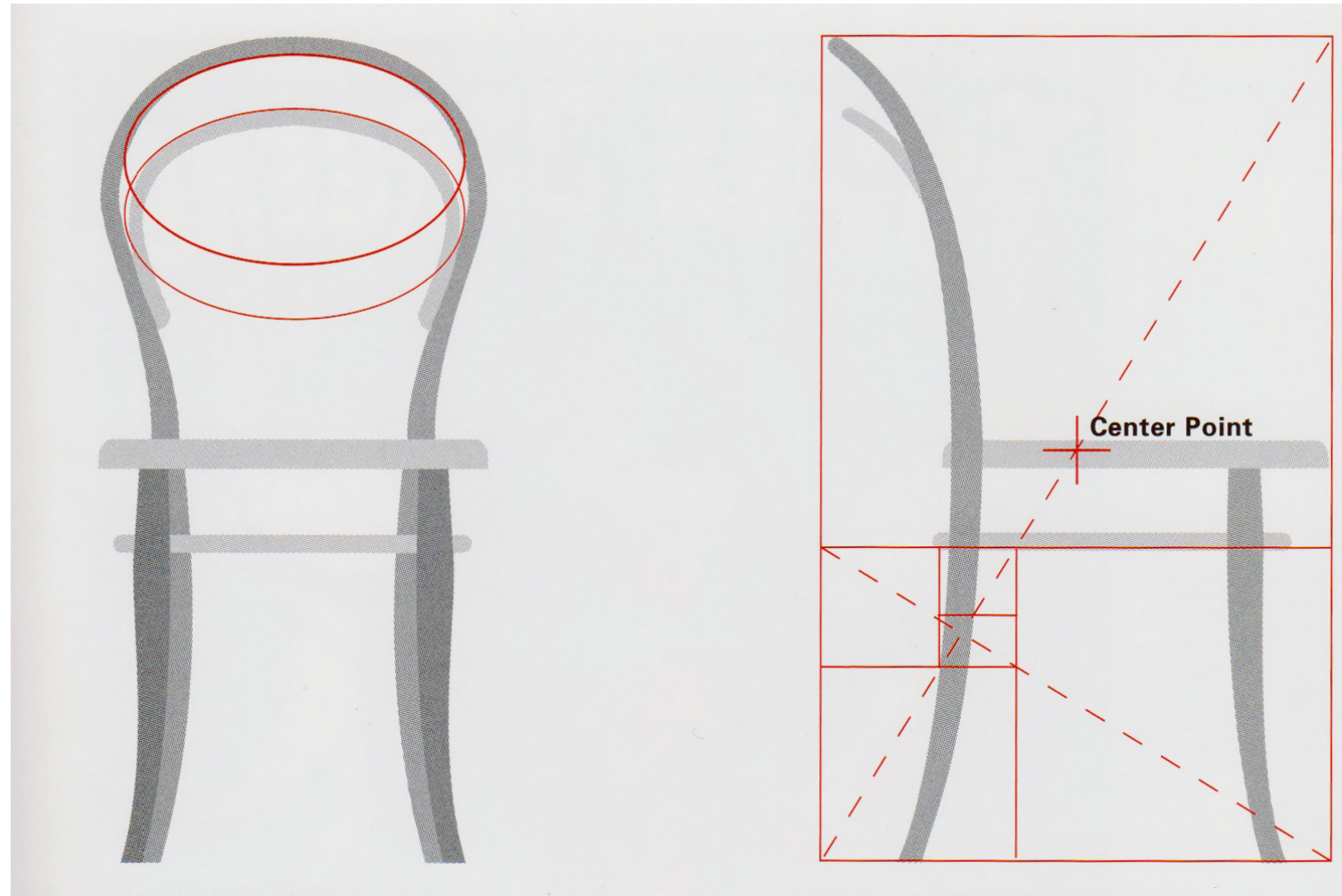
Individuare il punto di tangenza fra due archi di circonferenza

Trovati i centri dei due archi di circonferenza (O e Q, segui le indicazioni della slide precedente) sulla retta che congiunge i centri O e Q si trova il punto di tangenza.
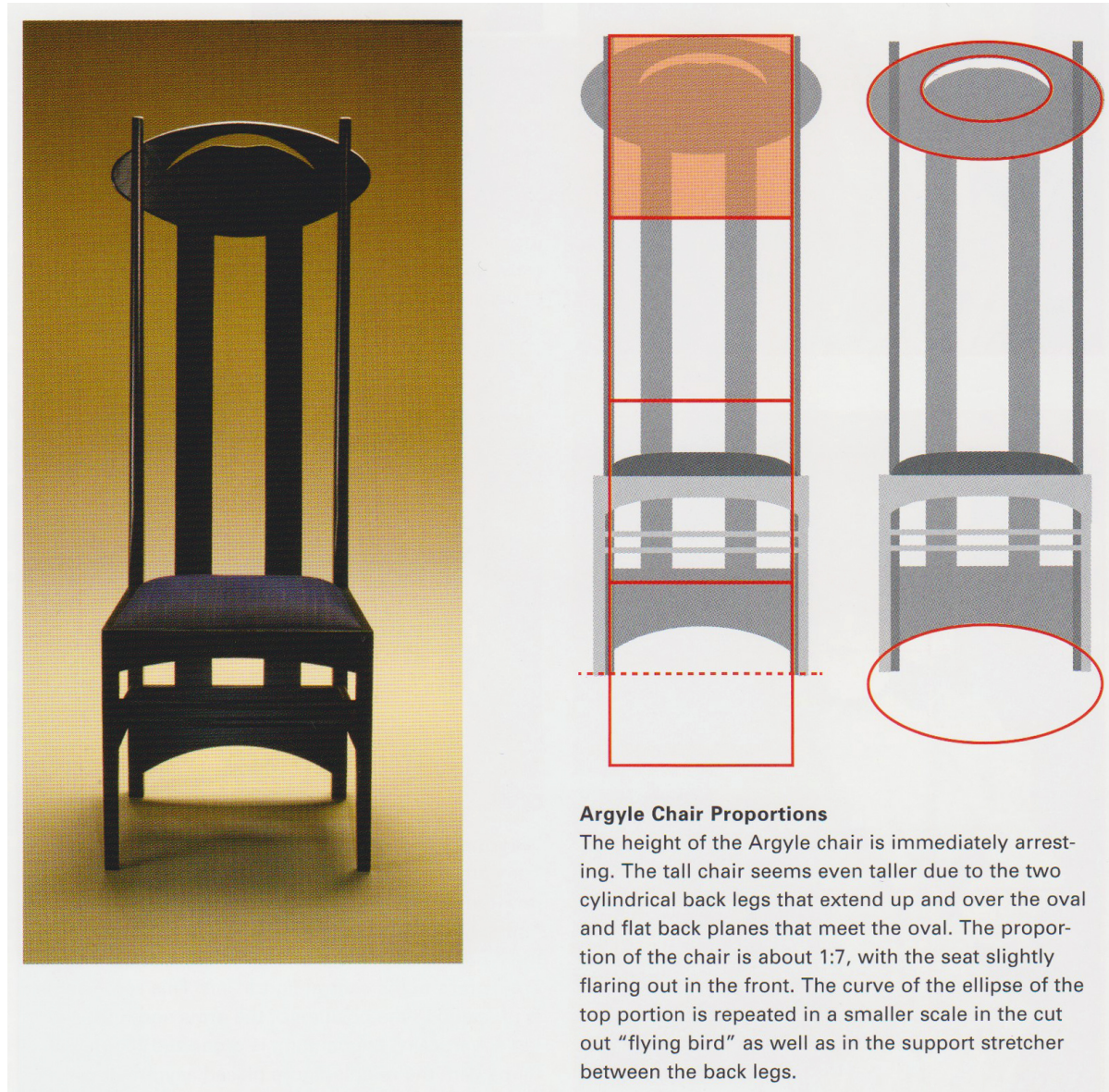
Esempi

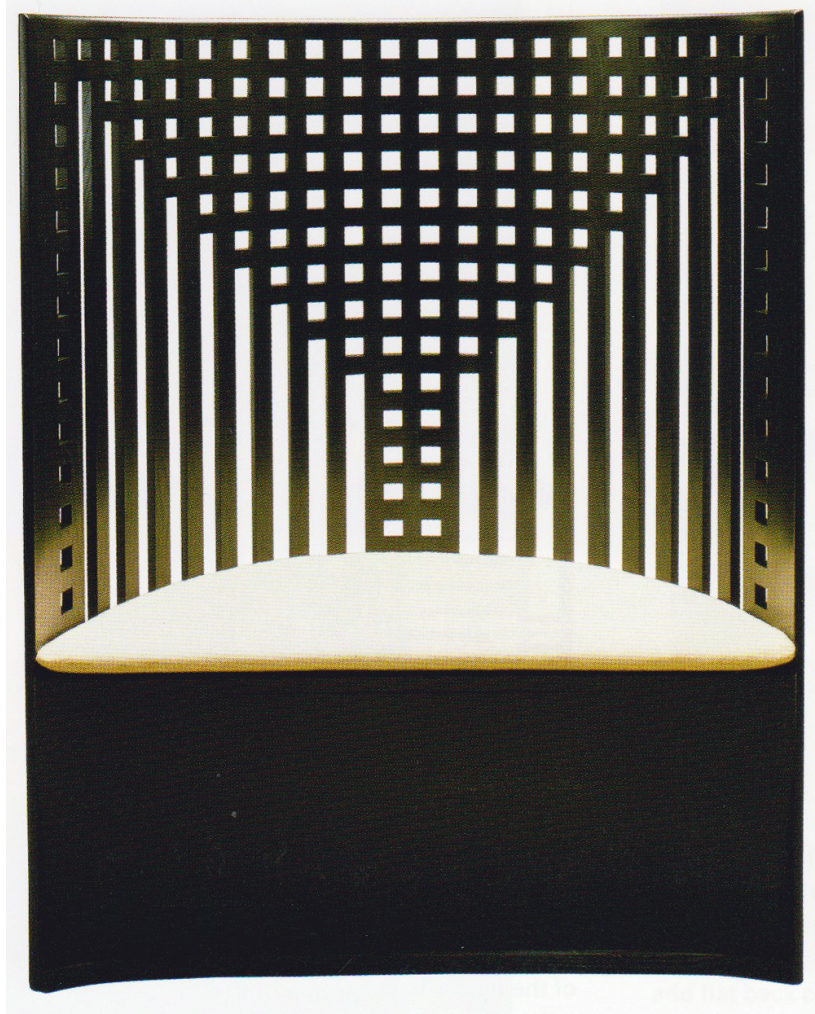Sedia Vienna n. 14 (Michael Thonet), 1859

Esempi

Argyle Chair Proportions
The height of the Argyle chair is immediately arresting. The tall chair seems even taller due to the two cylindrical back legs that extend up and over the oval and flat back planes that meet the oval. The proportion of the chair is about 1:7, with the seat slightly flaring out in the front. The curve of the ellipse of the top portion is repeated in a smaller scale in the cut out "flying bird" as well as in the support stretcher between the back legs.

Sedia Argyle (Charles Rennie Mackintosh) 1897

Esempi

Hill House Chair Proportions

The narrow long back of the chair and ladder struts that run all the way to the floor make the Hill House chair seem even taller. The proportion of the ladder-back portion of the chair is 1:11. The height of the chair can be described by a series of squares and the number 5. The height of the chair is 5.5 squares, based on the width of the ladder back, and there are 5.5 rungs in each square. The top grid pattern consists of 5 x 5 small squares.

Sedia Hill House (Charles Rennie Mackintosh) 1902

Esempi

Sedia Willow Tea Room (Charles Rennie Mackintosh) 1904

30 Modules

17 Modules

36.5 Modules

Willow Tea Room Chair
The scale and shape of the chair are imposing. The curve of the lattice back is close to a semicircle and the pure geometry of the grid pattern creates a satisfying repetition and contrast of right angles to the arc. The semicircle of the chair stands alone in the furnishings of the room with the grid squares tying it to the other chairs, decorations, and architecture.

The proportions of the chair are based on the arc of the circle. The chair is designed with the upholstery at the center point of the circle placed over the front view.

Vertical Slats
3.3° Apart

Front Edge of Seat

Center Line

9°

Center of Circle

Esempi

MR Chair, Front View
The MR chair front view fits in a golden section rectangle and the center point of the rectangle is at the seat.
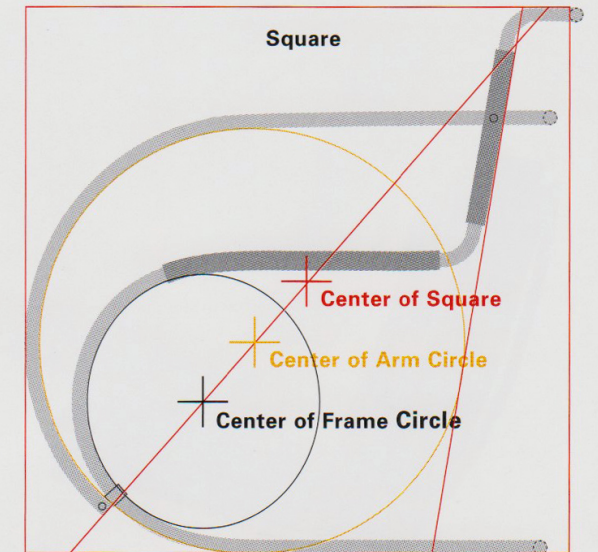
MR Chair, Side View
The MR chair side view fits in a square. The center point of the square, center of the arm circle, and center of the frame circle all align on the same diagonal. The slope of the chair back is tangent to the arm circle.

Sedia MR (Mies van der Rohe), 1927

Esempi
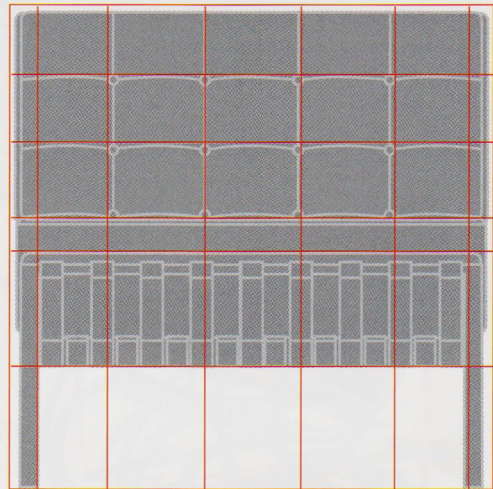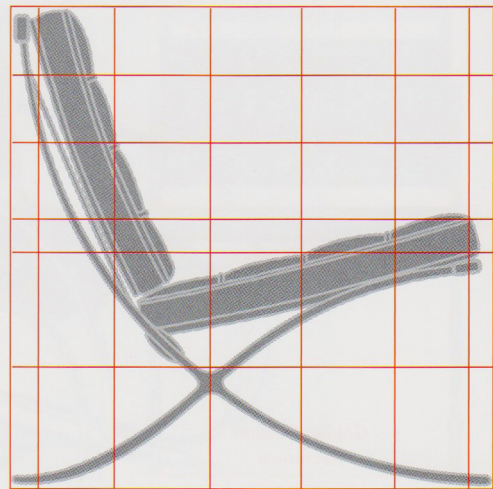
Chair Proportions (right)
The chair side view (top right) as well as front view (bottom right) fit perfectly into a square. The divisions of the back cushion approximate small root 2 rectangles.

Sedia Barcelona (Mies van der Rohe), 1929

equal to the depth, i.e, it fits perfectly into a cube. The rectangles of leather on the cushions are in root 2 rectangle proportion attached to a steel frame. The same rectangles were designed so that when the chair was upholstered they would still be perfect rectangles despite the stress and tension of the upholstery process. The script "x" construction of the legs form an elegant frame and lasting trademark for the chair.
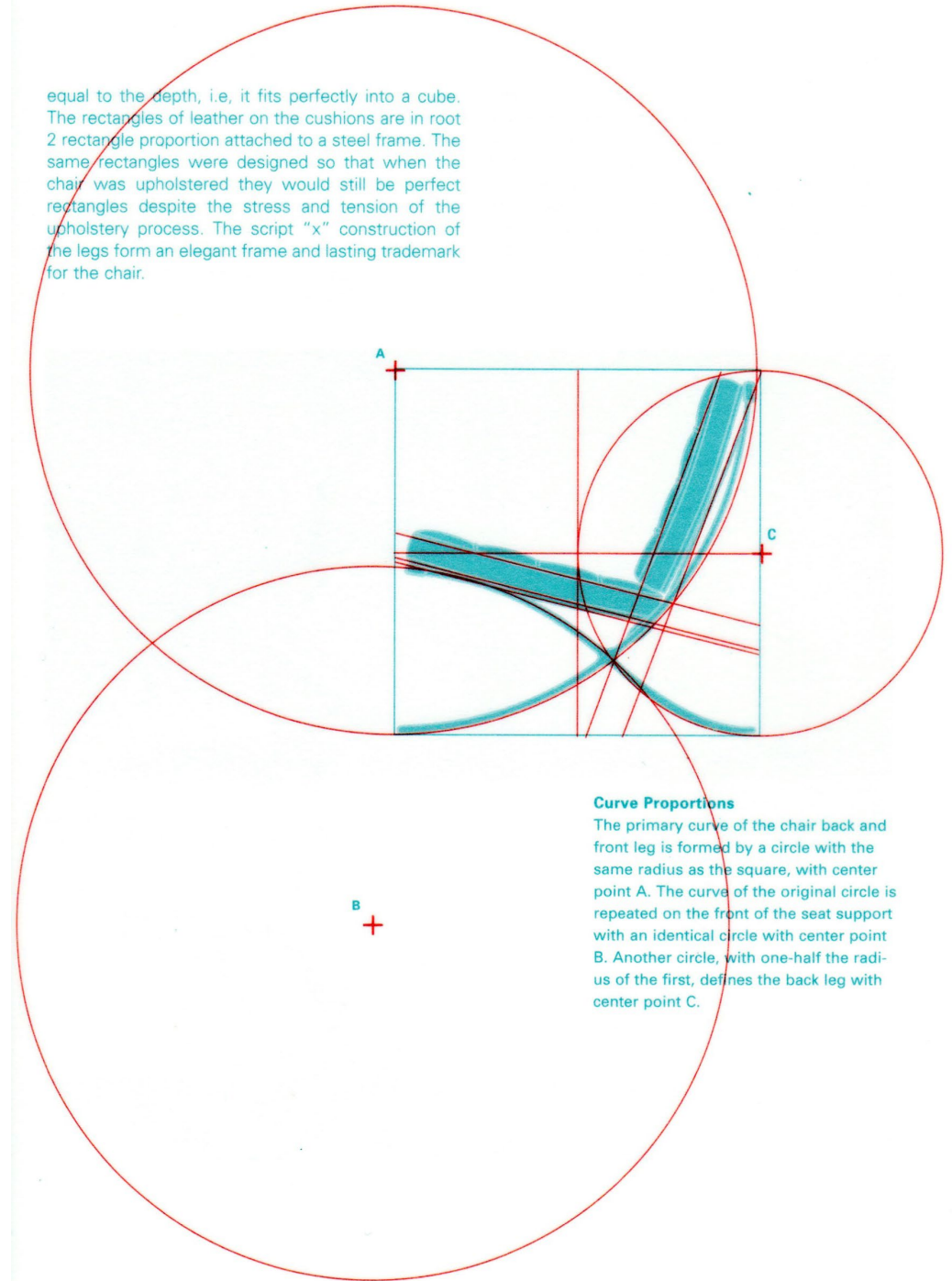
Curve Proportions
The primary curve of the chair back and front leg is formed by a circle with the same radius as the square, with center point A. The curve of the original circle is repeated on the front of the seat support with an identical circle with center point B. Another circle, with one-half the radius of the first, defines the back leg with center point C.

Esempi

Chaise Longue (Le Corbusier), 1929

Esempi

Sedia Brno (Mies van der Rohe), 1929

Analysis
The top view fits perfectly
into a square (above
right). The front view of
the chair (right) and side
view (far right) fit neatly
into a golden section rect-
angle. The angle of the
front legs and chair back
(below right) are symmet-
rical, and the radii of the
curves are in 1:3 propor-
tion.
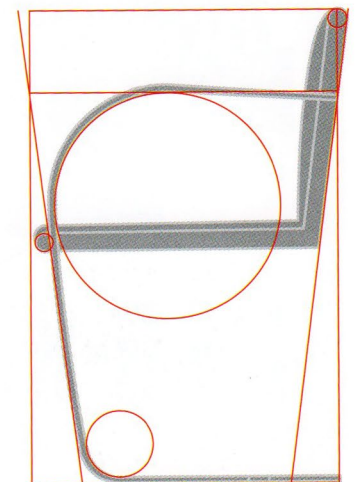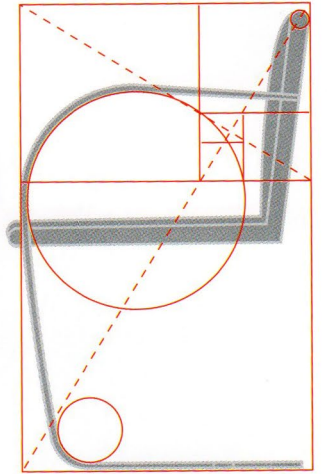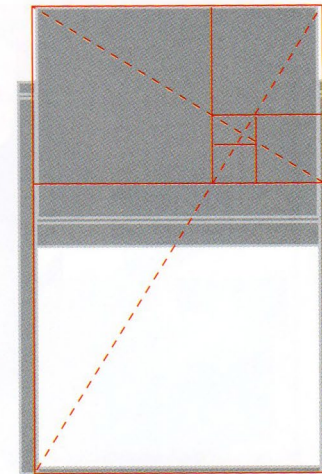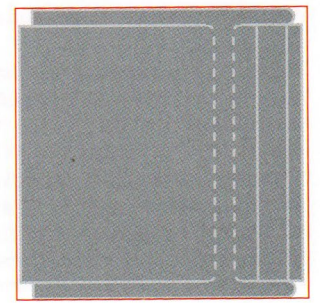
Esempi

Original Barrel Chair, 1903
The early version of the Barrel Chair had flared arms that terminated in a pointed angle. The base was broad and accented with moulding and small brackets supported the seat. The chair back was thick and flared back from the arms.

Refined Barrel Chair, 1937
The Refined Barrel Chair has a simplified frame. The flared arms have been tapered to a straight line that terminates in a radius. The back support is less thick, narrower, and extends straight up from the arms to a slight flare. The base is also simplified without the extra moulding.
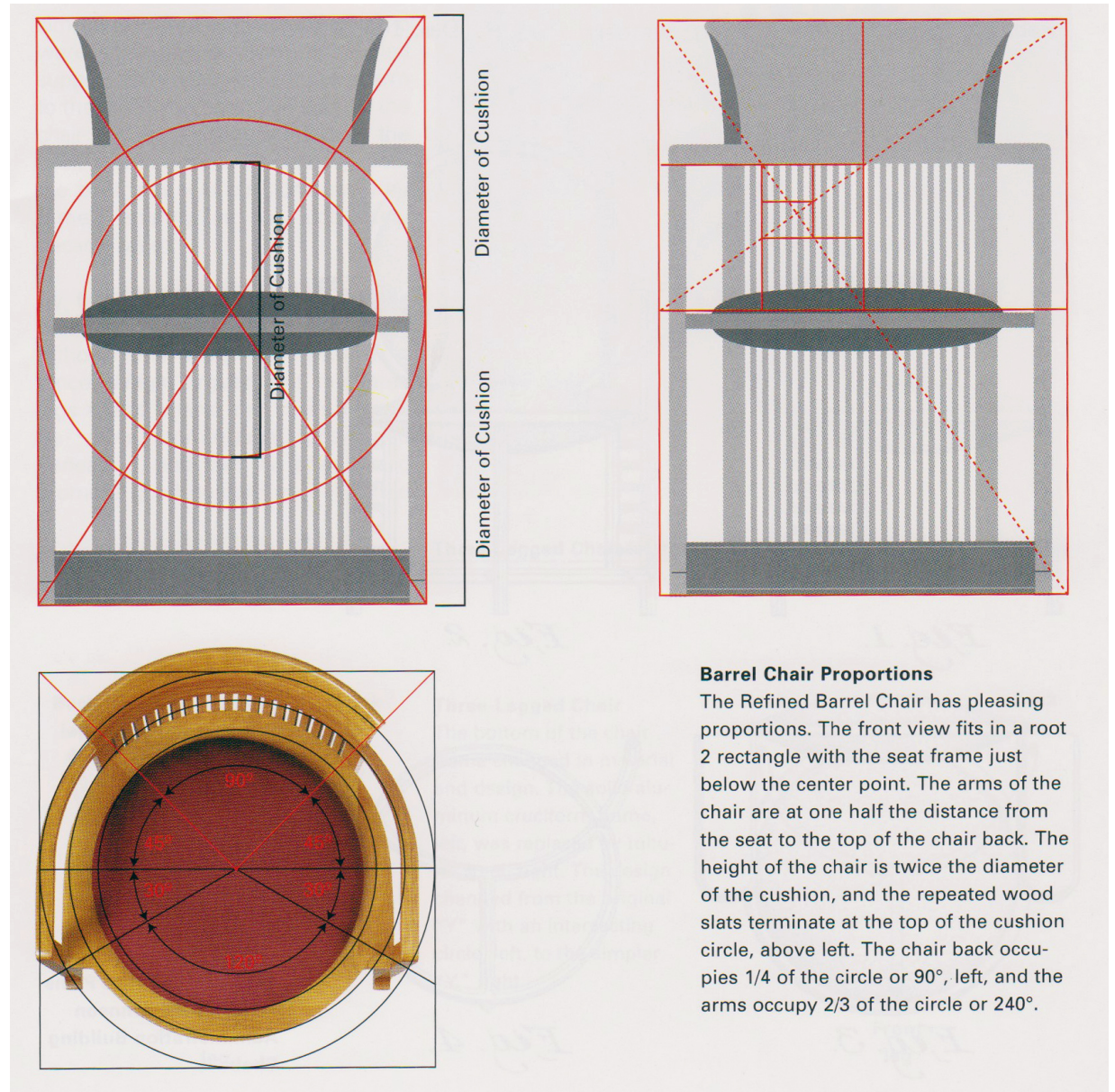
Barrel Chair Proportions
The Refined Barrel Chair has pleasing proportions. The front view fits in a root 2 rectangle with the seat frame just below the center point. The arms of the chair are at one half the distance from the seat to the top of the chair back. The height of the chair is twice the diameter of the cushion, and the repeated wood slats terminate at the top of the cushion circle, above left. The chair back occupies 1/4 of the circle or 90°, left, and the arms occupy 2/3 of the circle or 240°.

Sedia Barrel (Frank Lloyd Wright), 1904,1937

Esempi

Officer's Chair

Production Version, Officer's Chair
The frame of the chair fits in a golden section rectangle with the seat and back fitting into the square of the rectangle. The circle is repeated in the back, seat, and frame. The lower frame supports align with the golden section construction diagram.

Width = 3 units

Height = 5 units
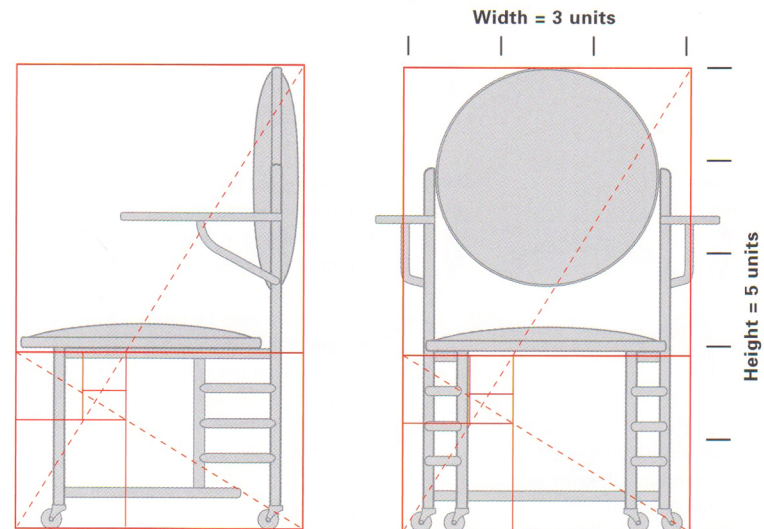
Sedia Johnson (Frank Lloyd Wright), 1938

Esempi

Sedia Plywood (Charles Eames), 1946

The current chair, still in production, evolved from that winning entry. It is impossible to state unequivocally that the relationship of the chair's proportions to the golden section rectangle were fully consciously planned, but the classical Beaux-Arts training, as well as the collaboration with Eero Saarinen, make this assumption highly likely.
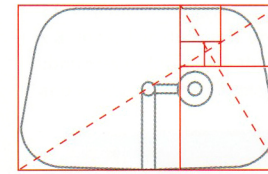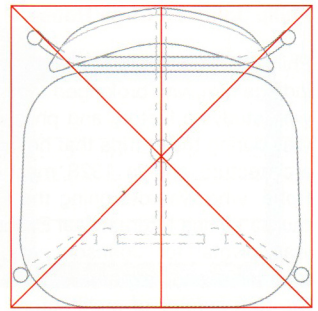
Chair Back (above)
The chair back fits perfectly into a golden section rectangle.

Chair Proportions (right)
The dining chair proportions are roughly those of the golden section.
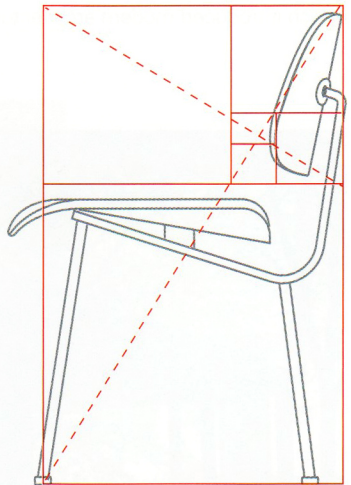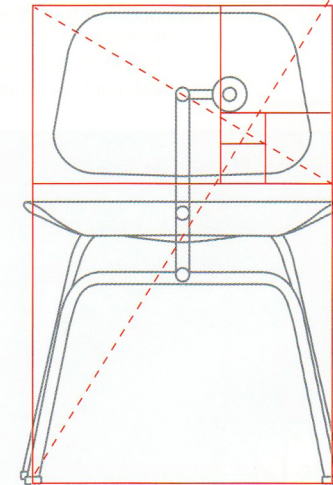
Chair Detail Proportions
The radii of the corners of the chair back as well as the tubular legs are in proportion to each other 1:4:6:8.

A= 1
B= 4
C= 6
D= 8
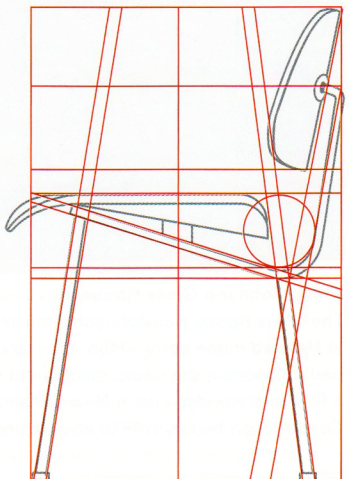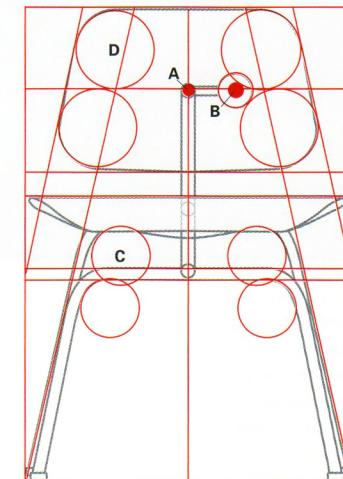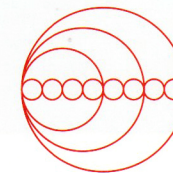
Esempi

Sedia Tulipano (Eero Saarinen), 1957

Golden Ellipse
Similar to the golden rectangle, the ratio of the major axis to the minor axis of the golden ellipse is 1:1.62. There is also evidence that the human cognitive preference is with an ellipse of these proportions.
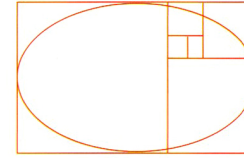
Analysis
The front view of the chair fits easily into golden section proportions (right). The front view can also be analyzed as two overlapping squares: the bottom square meeting the top of the seat cushion and the top square meeting the joint of the pedestal to the seat.

The major chair pedestal curves to conform readily to the golden ellipse proportions at both the top and bottom.
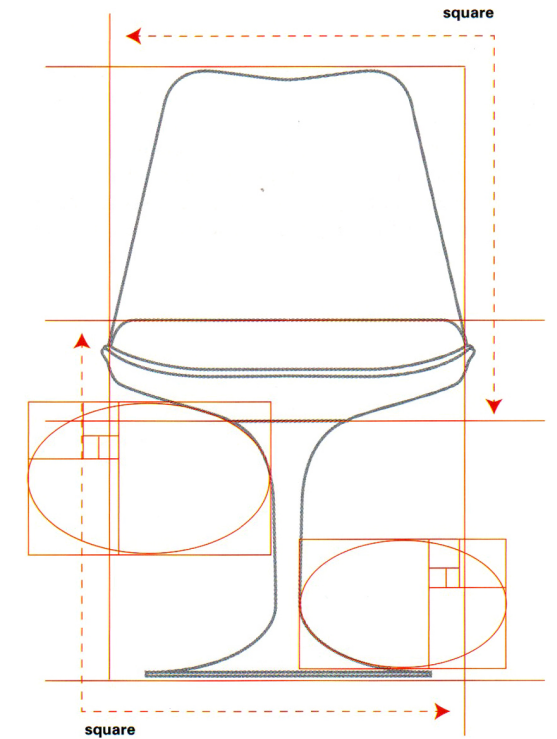
Side and Front Views
Both the side (right) and front views (far right) of the Tulip chair fit comfortably into a golden section rectangle. The front lip of the chair is at the center point of the golden rectangle. The base as it attaches to the seat of the chair is about 1/3 the width.
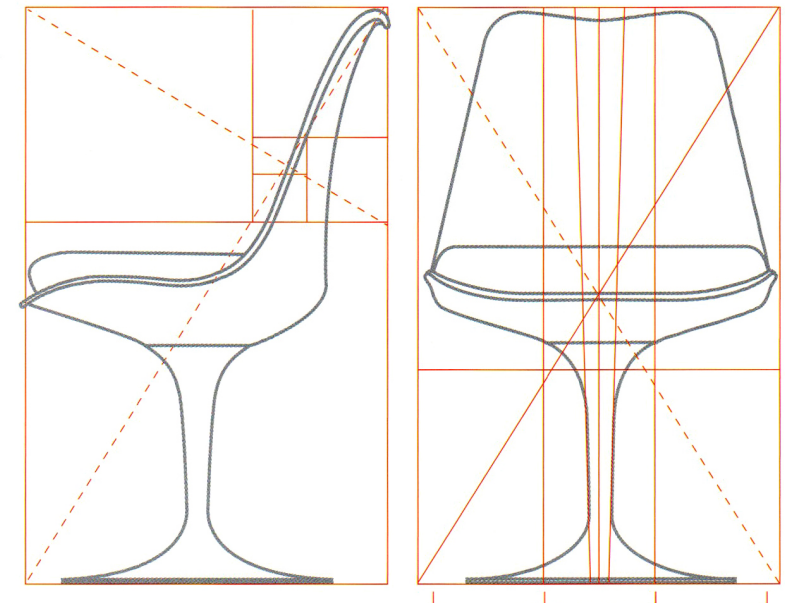
Esempi

Minipimer Braun, 1987

All Small Radii Are Similar

½ Total Height

Center Point

½ Total Height
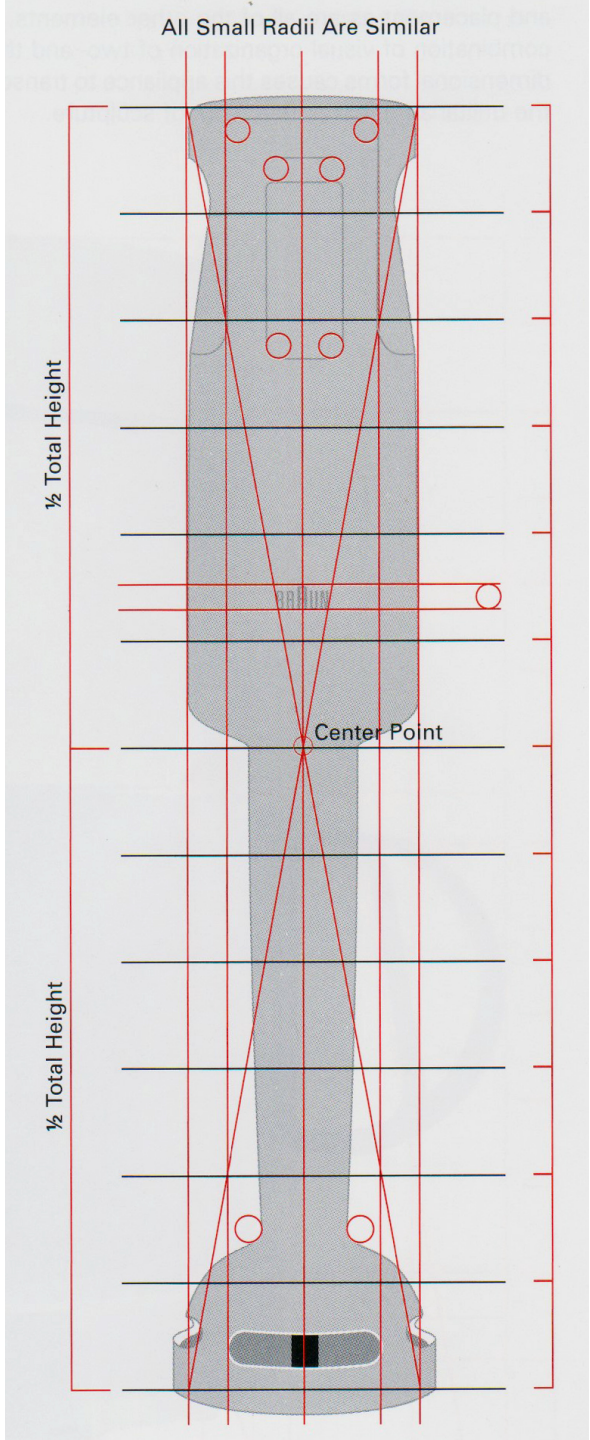
Esempi

Caffettiera Braun, s.d.

Structure and Proportion
The surface of the coffee maker can be divided into a regular series. Each surface element is carefully planned to be in harmony with all others. The logotype, Braun, is slightly above the center. The cylindrical shape of the coffee maker is in keeping with the shape of the handle, which is a segment of a circle. The diagonal of the handle aligns with the top corner. The symmetry of elements can be seen in the fasteners on the switch that align with the measure marks on the pot as well as the center vent opening on the top.
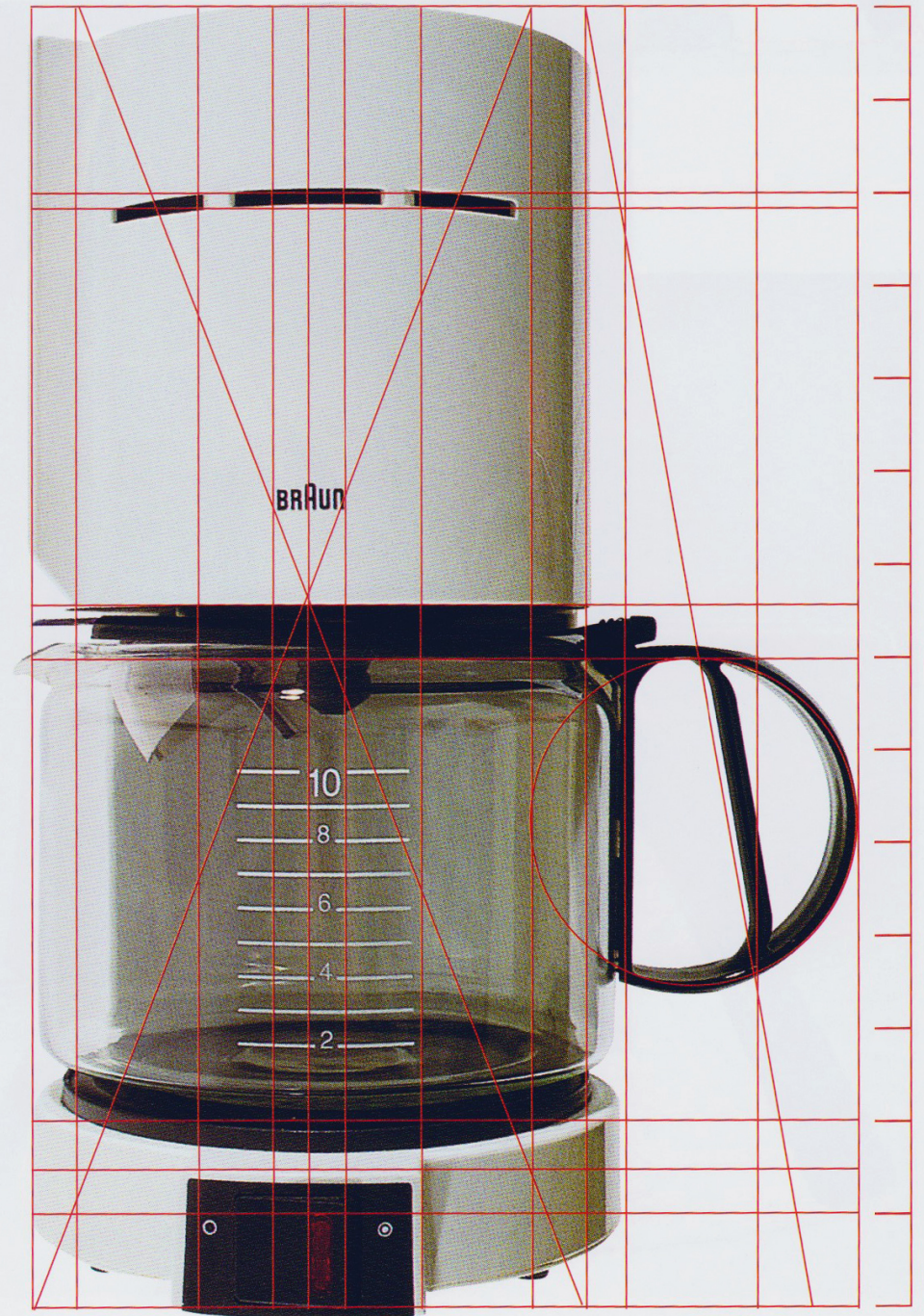
Esempi

Il Conico (Aldo Rossi), 1980-1983

Dominant Form
The dominant shape of Il Conico is the cone derived from an equilateral triangle. The handle is an inverted right triangle, one half of an equilateral triangle, and can also be viewed as a portion of a square.
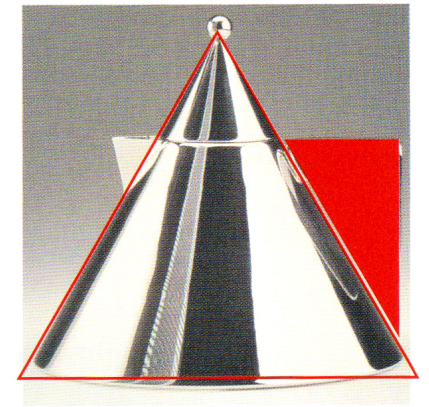
Geometric Structure
The kettle can readily be analyzed with a 3 x 3 grid. The top third is composed of the lid and sphere handle, the middle third the spout and kettle handle, and the wide bottom base permits the maximum contact with the heating surface.
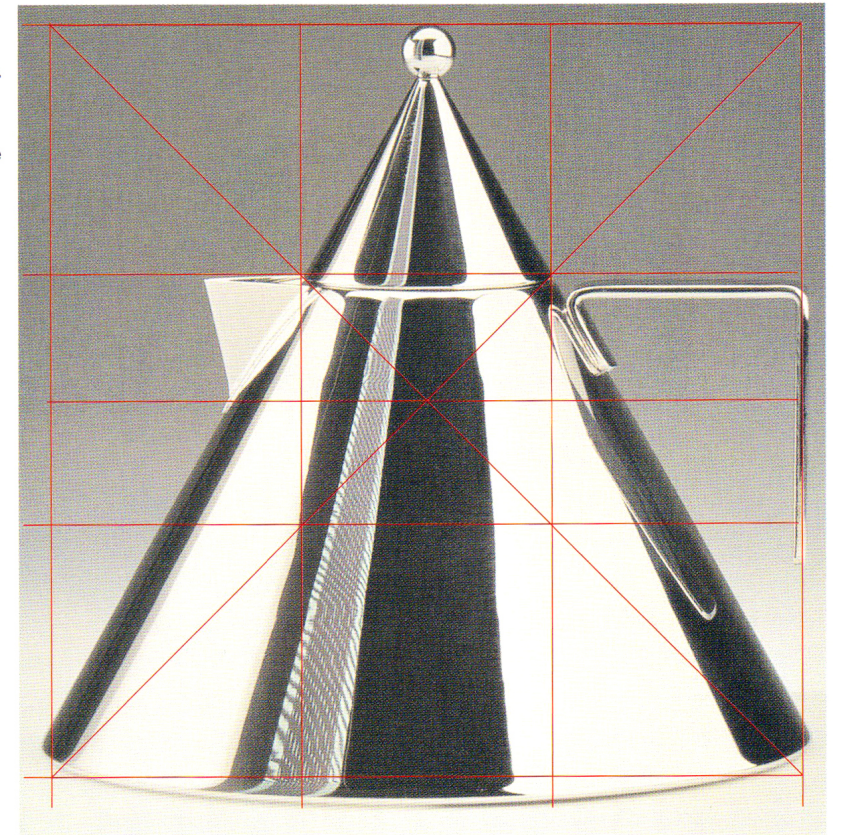
Esempi
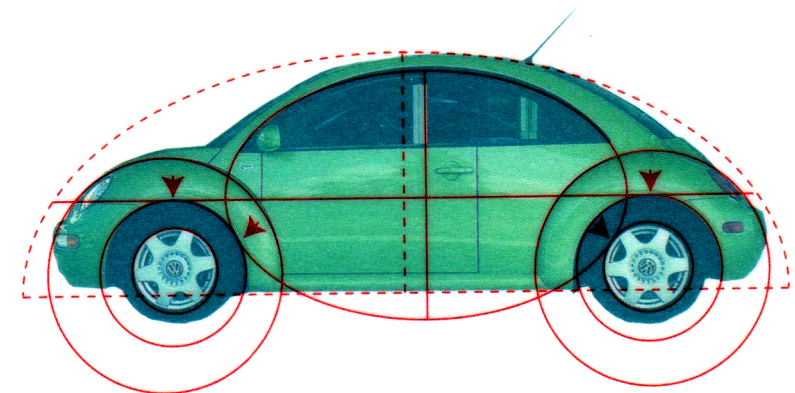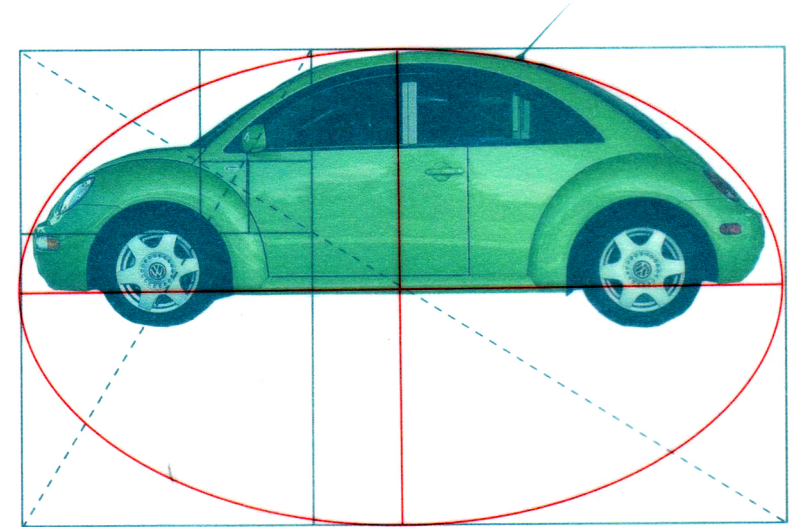
Volkswagen Maggiolino (J. Mays, F. Thomas, P. Schreyer), 1997

Gli studenti
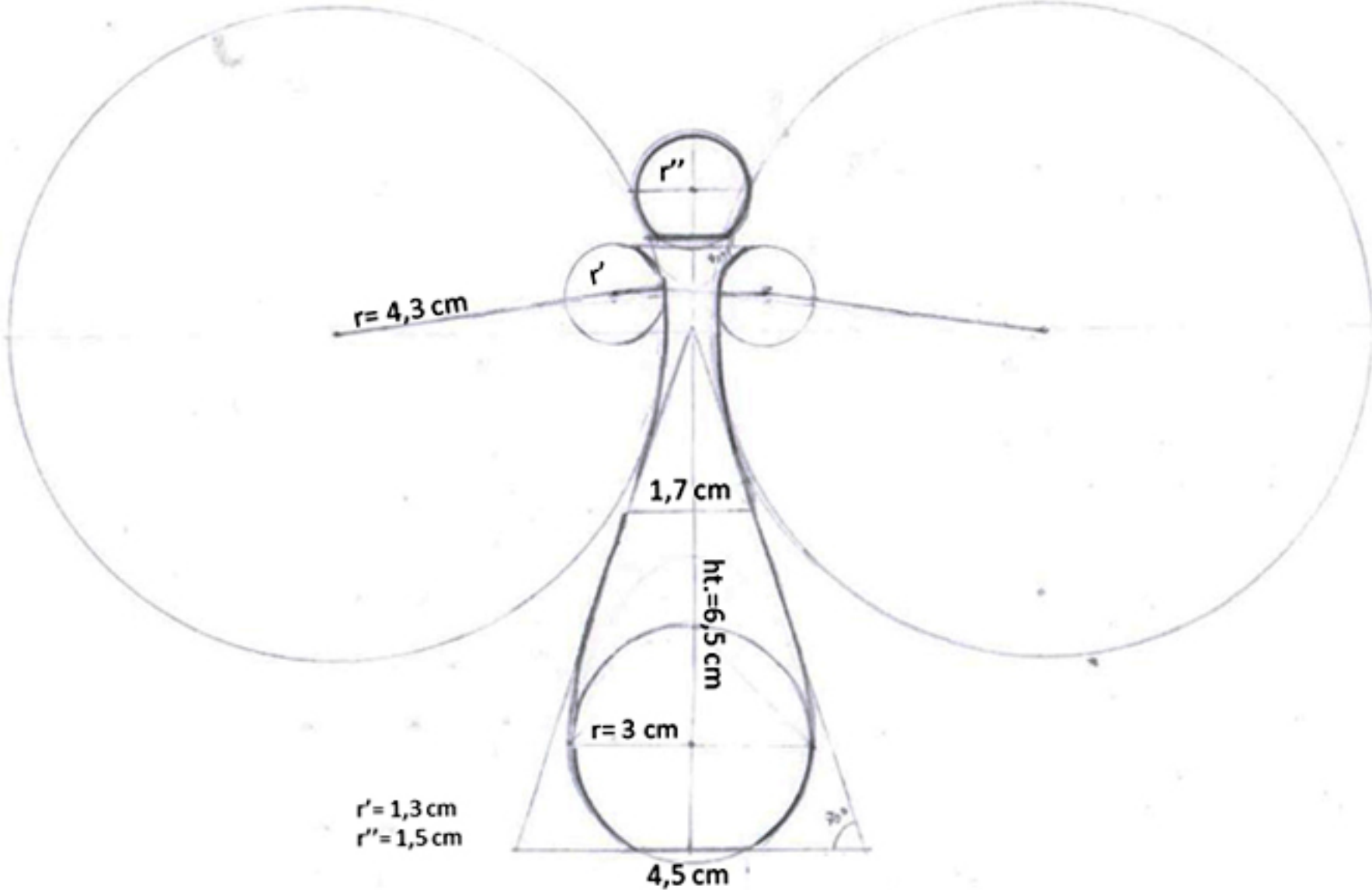
Windy Mae Nieva

Gli studenti

Fabio Gaglioti

Gli studenti

4,2cm

60°
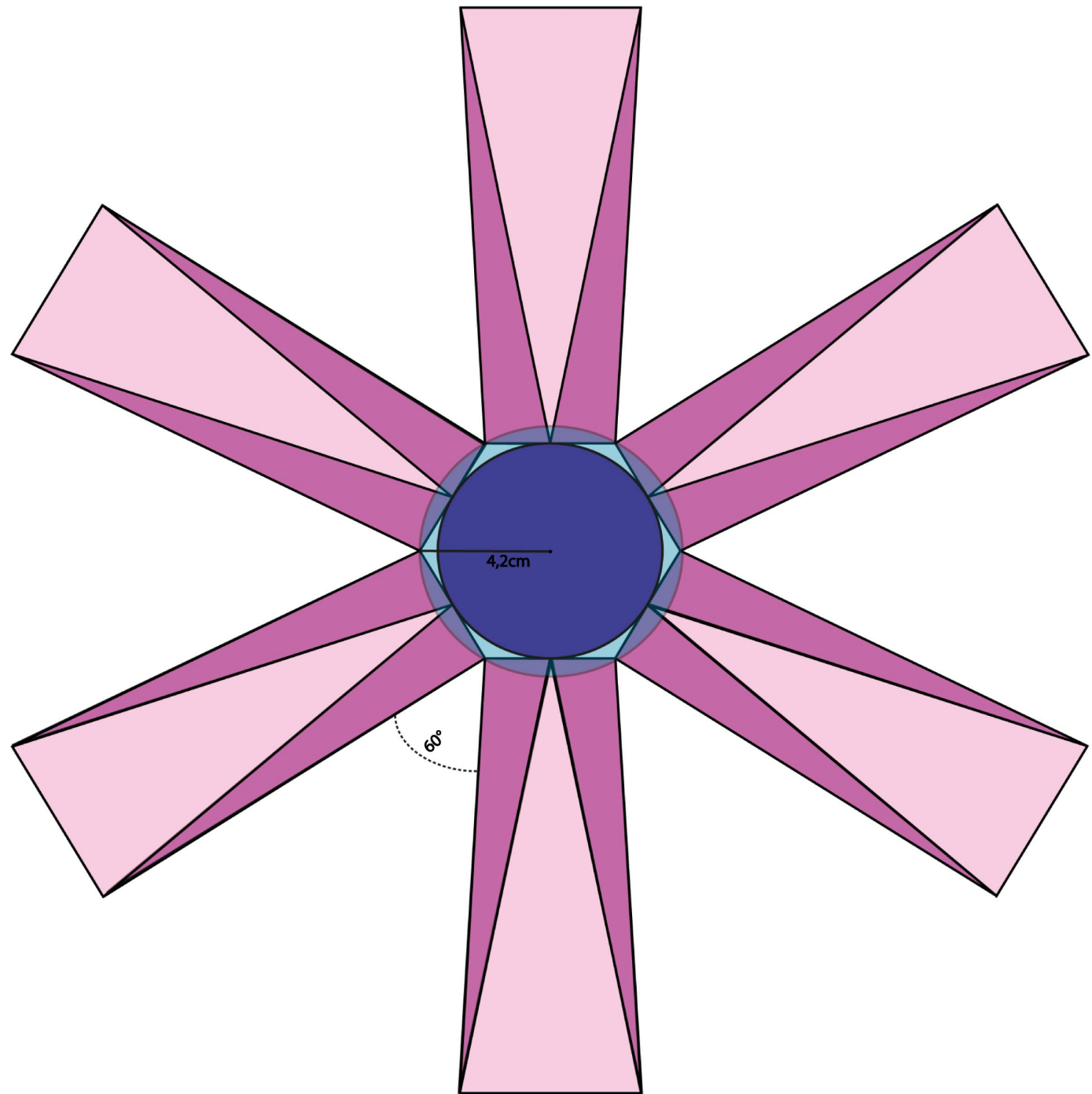
Beatrice Cundò

Gli studenti

Martina Marzullo

81° 87°
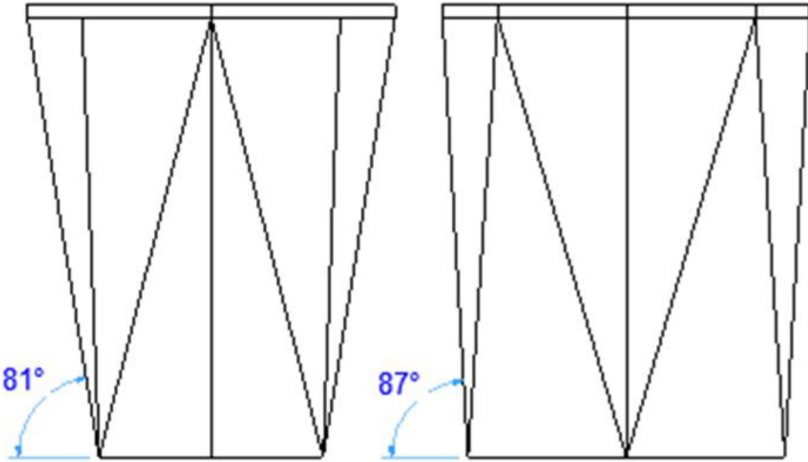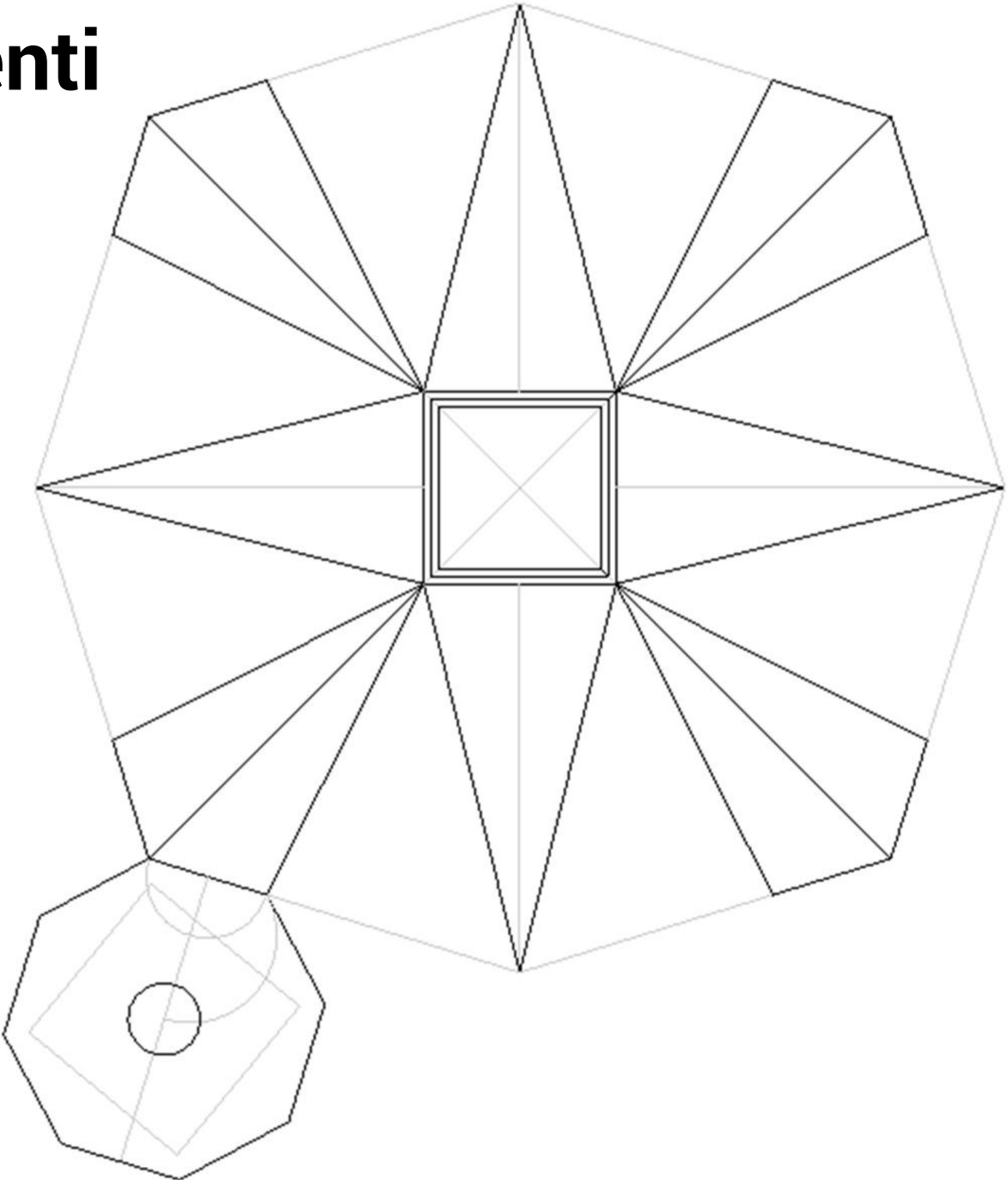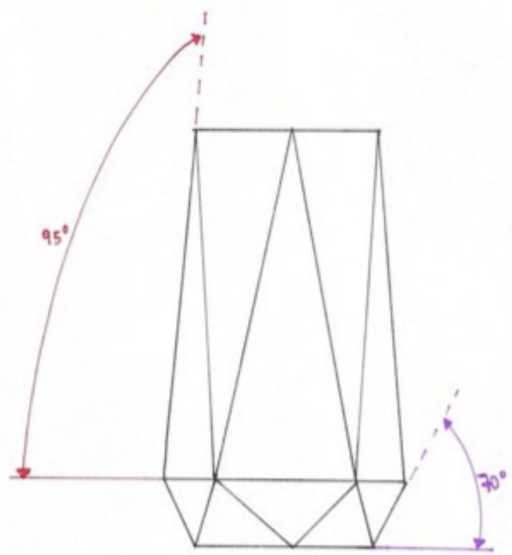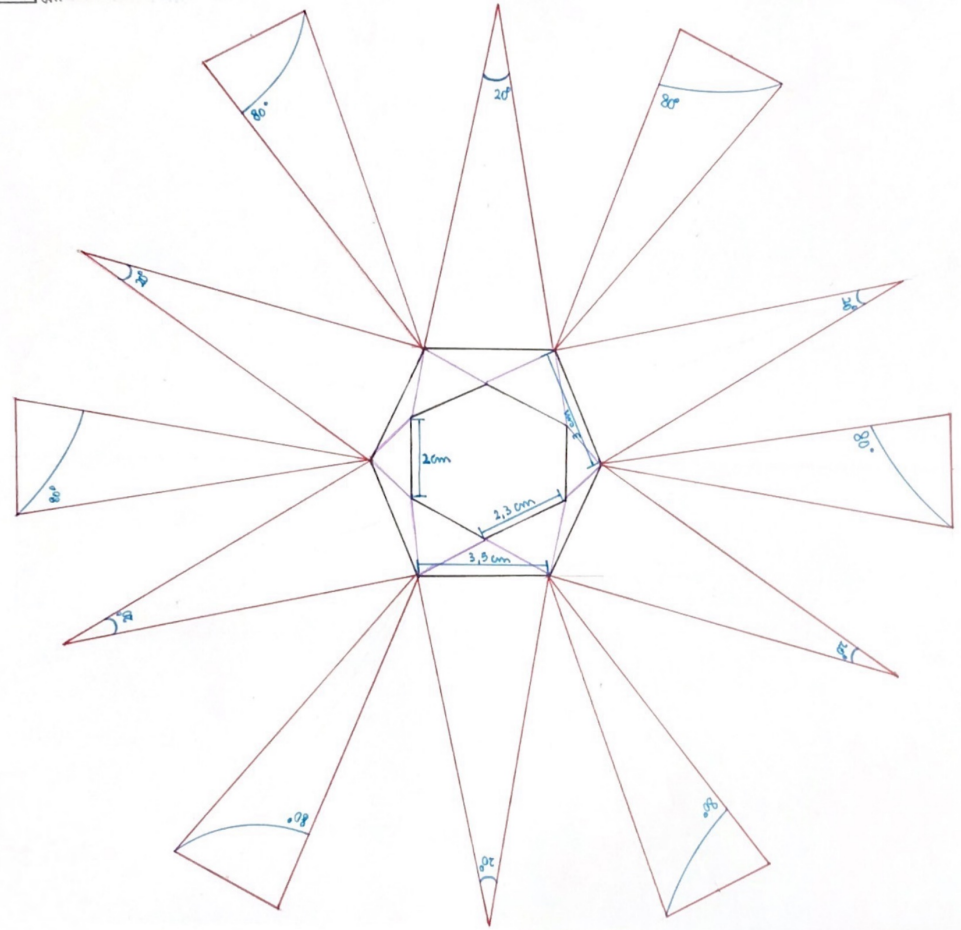
Gli studenti

Maria Giovanna Postilotti
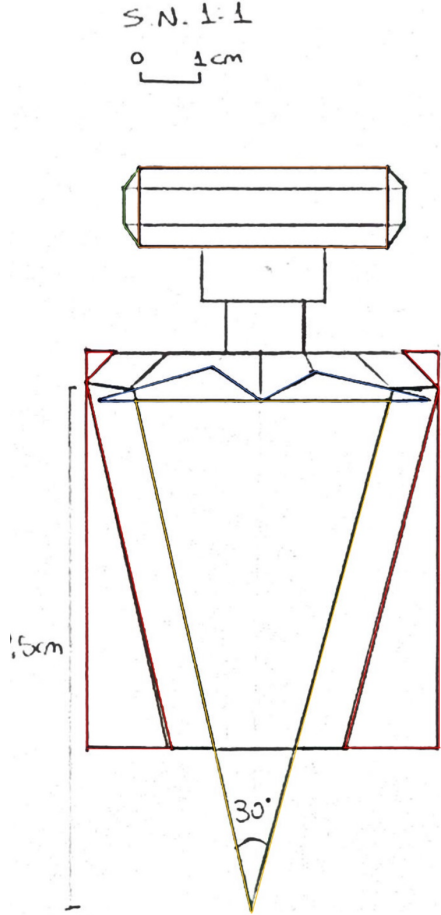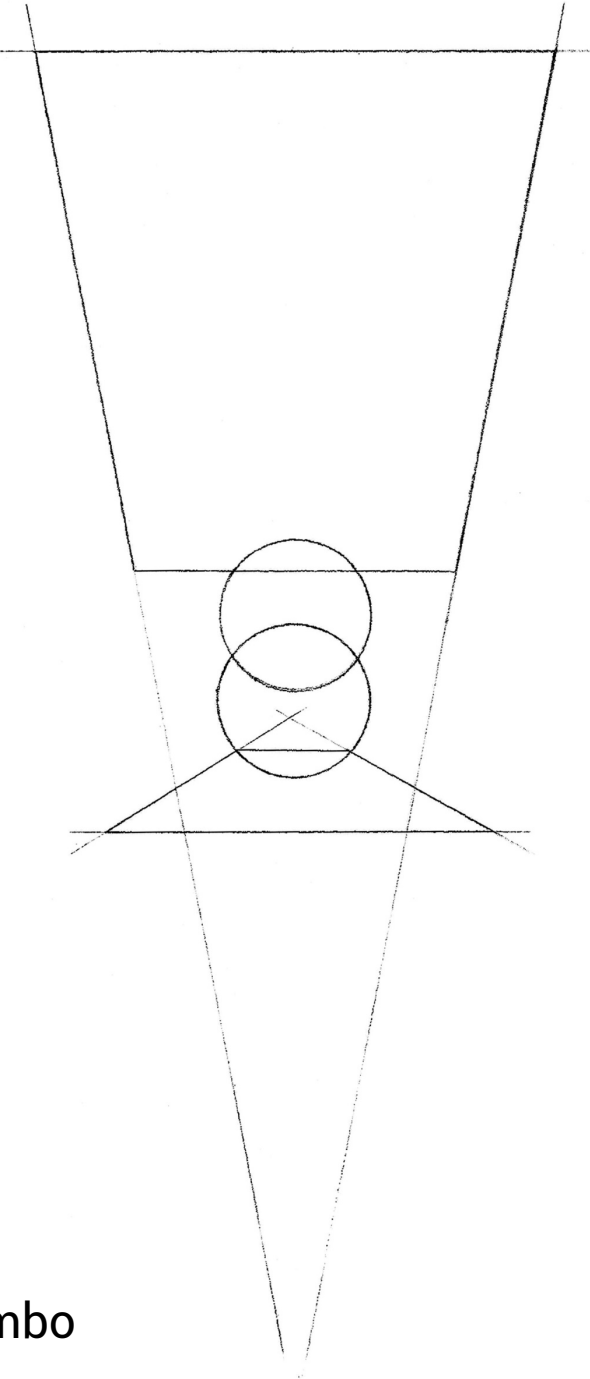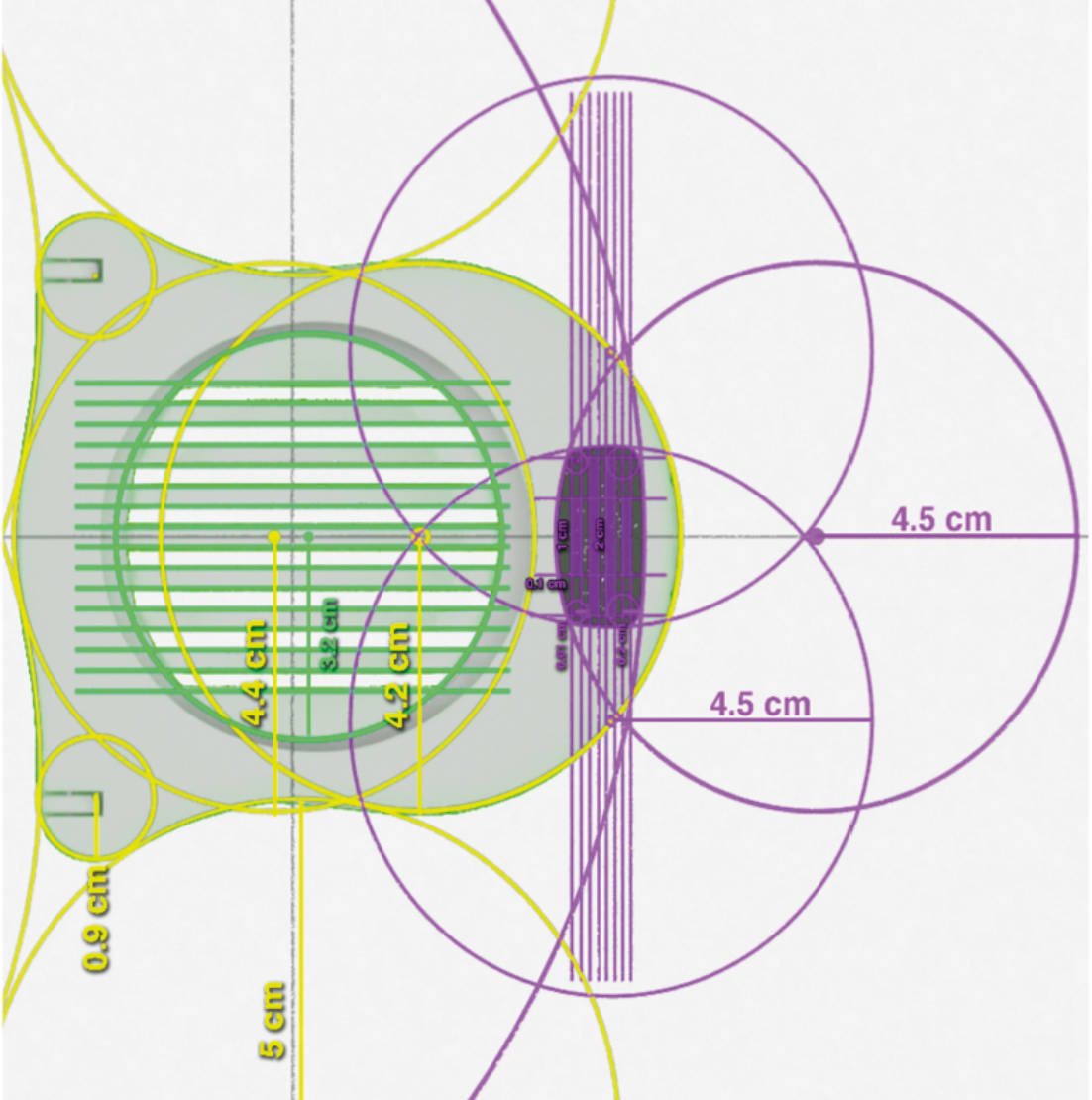
Gli studenti

3:1

r=43cm

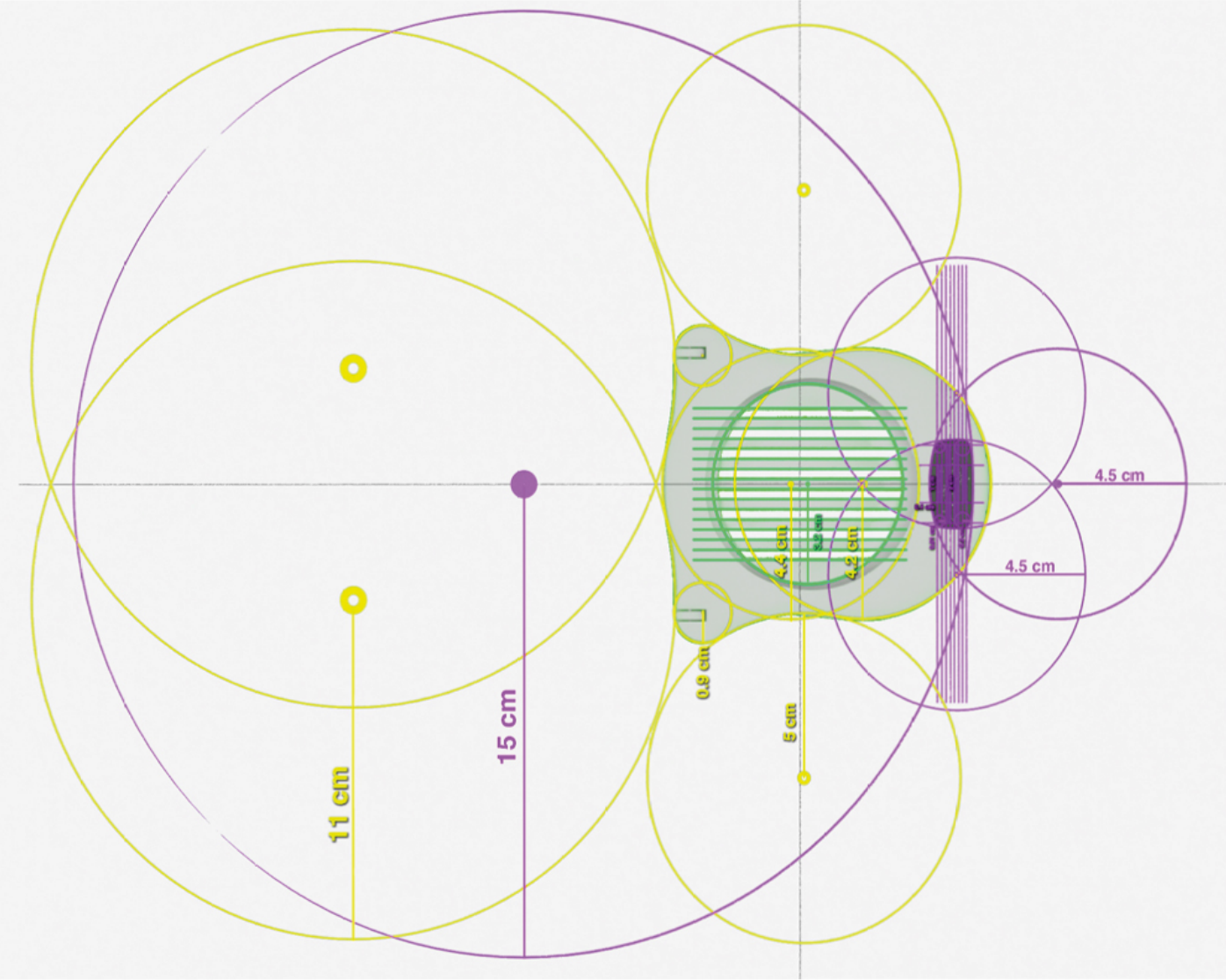r=16604cm
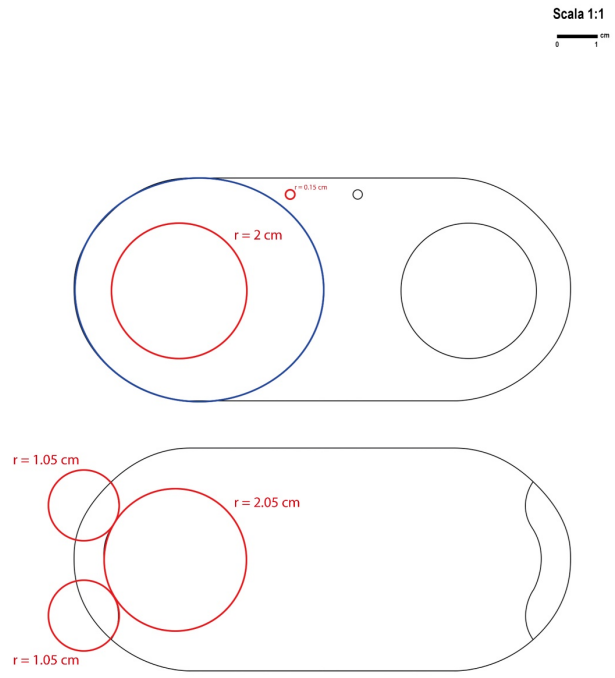
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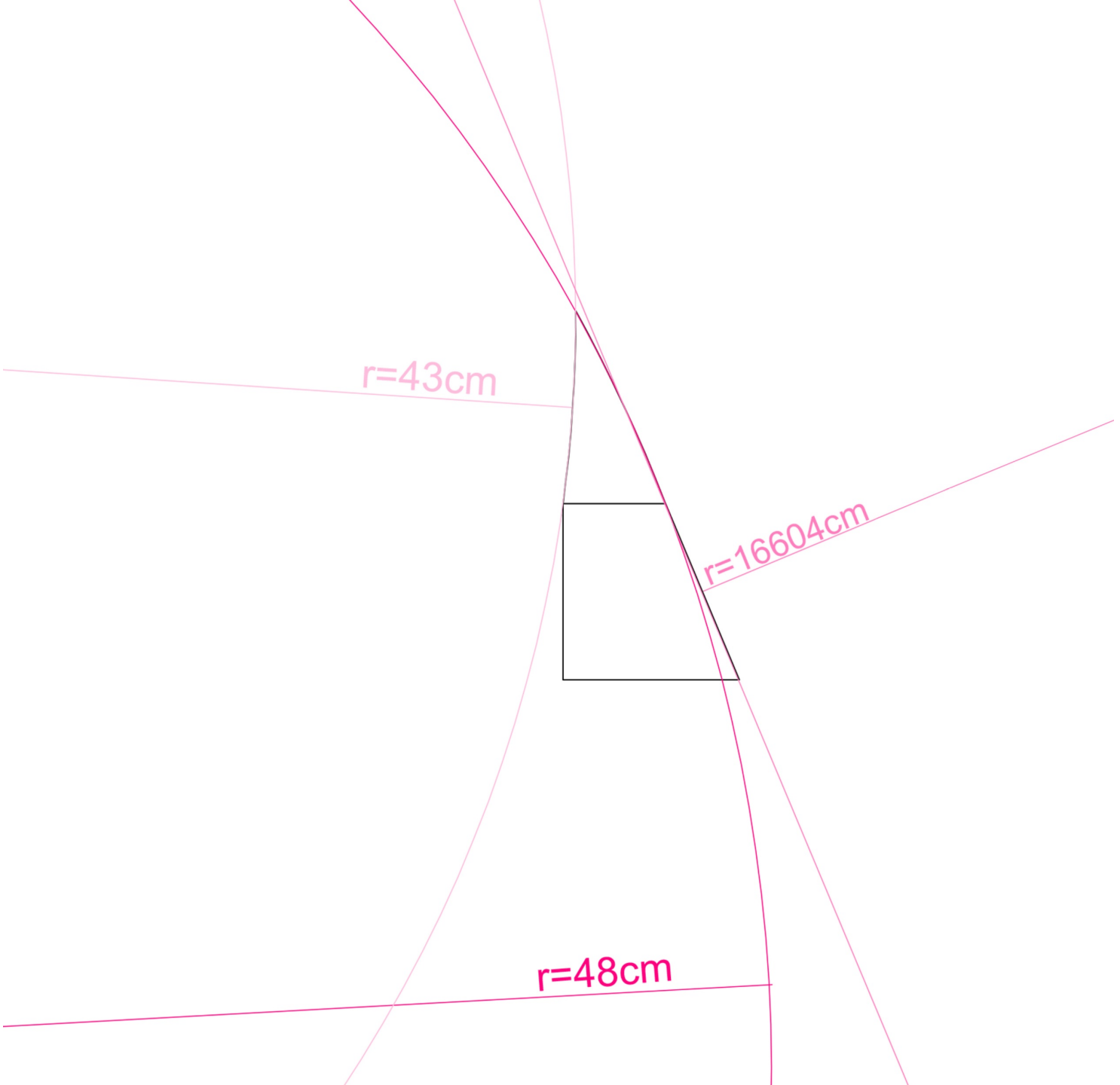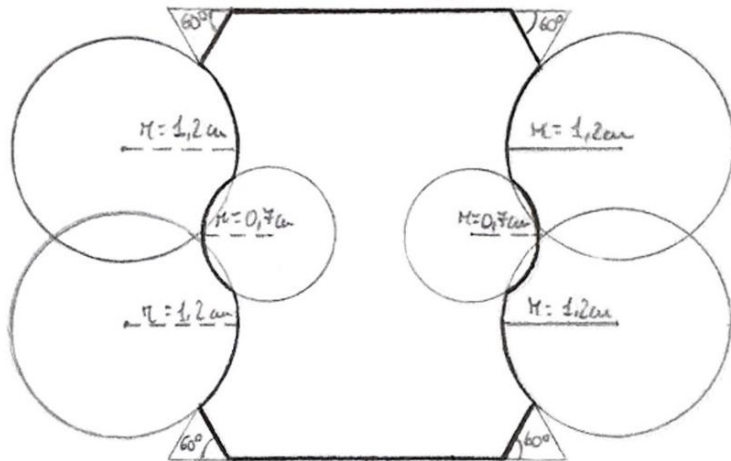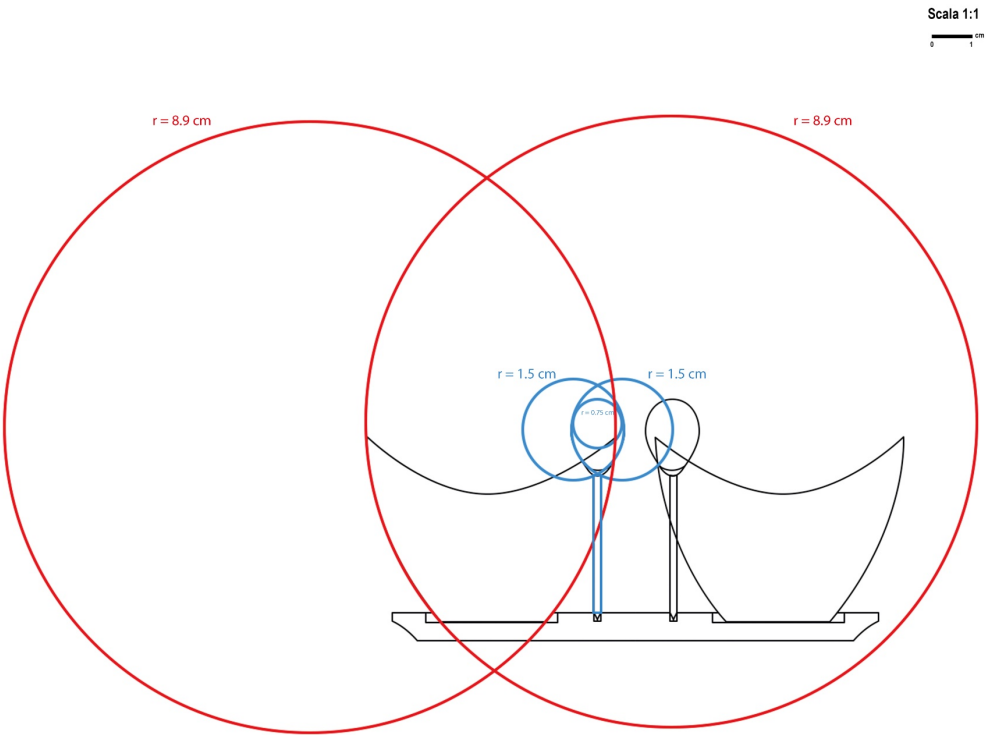
Ylenia De Lisi, Luana Sartiano
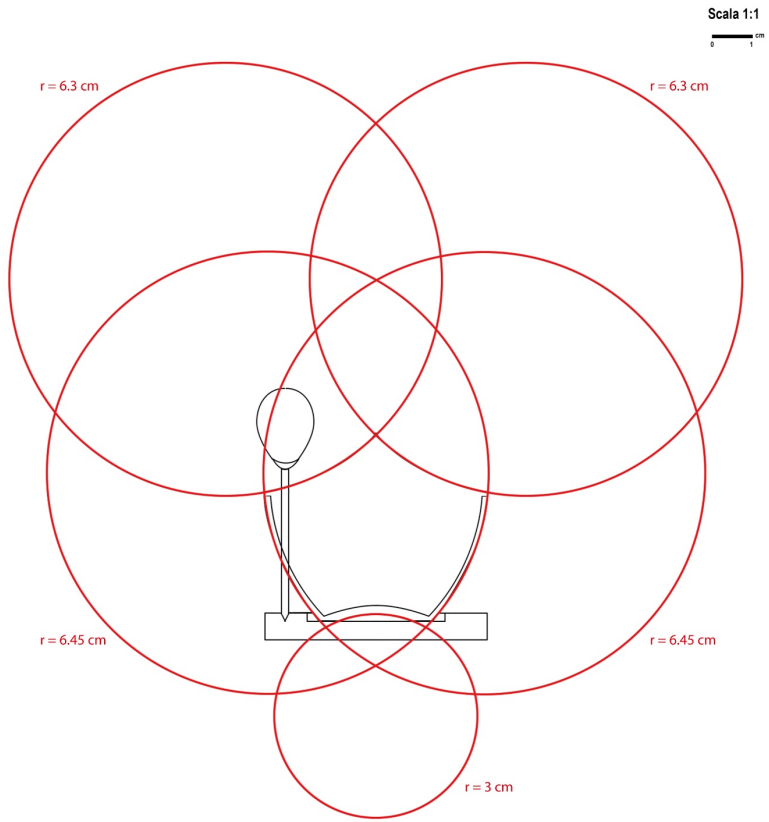
Gli studenti
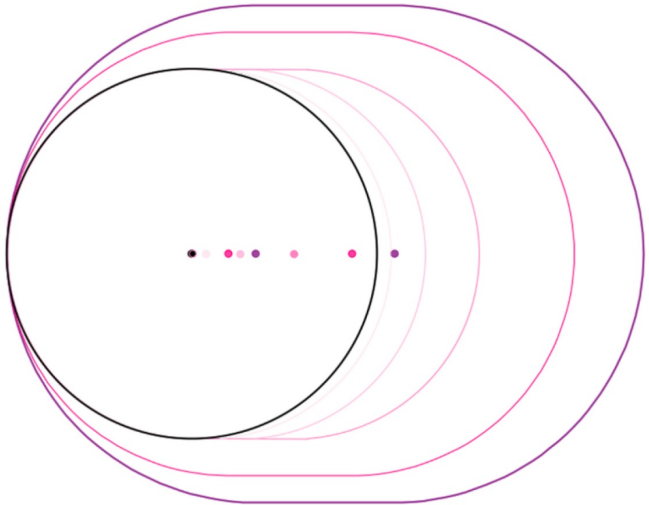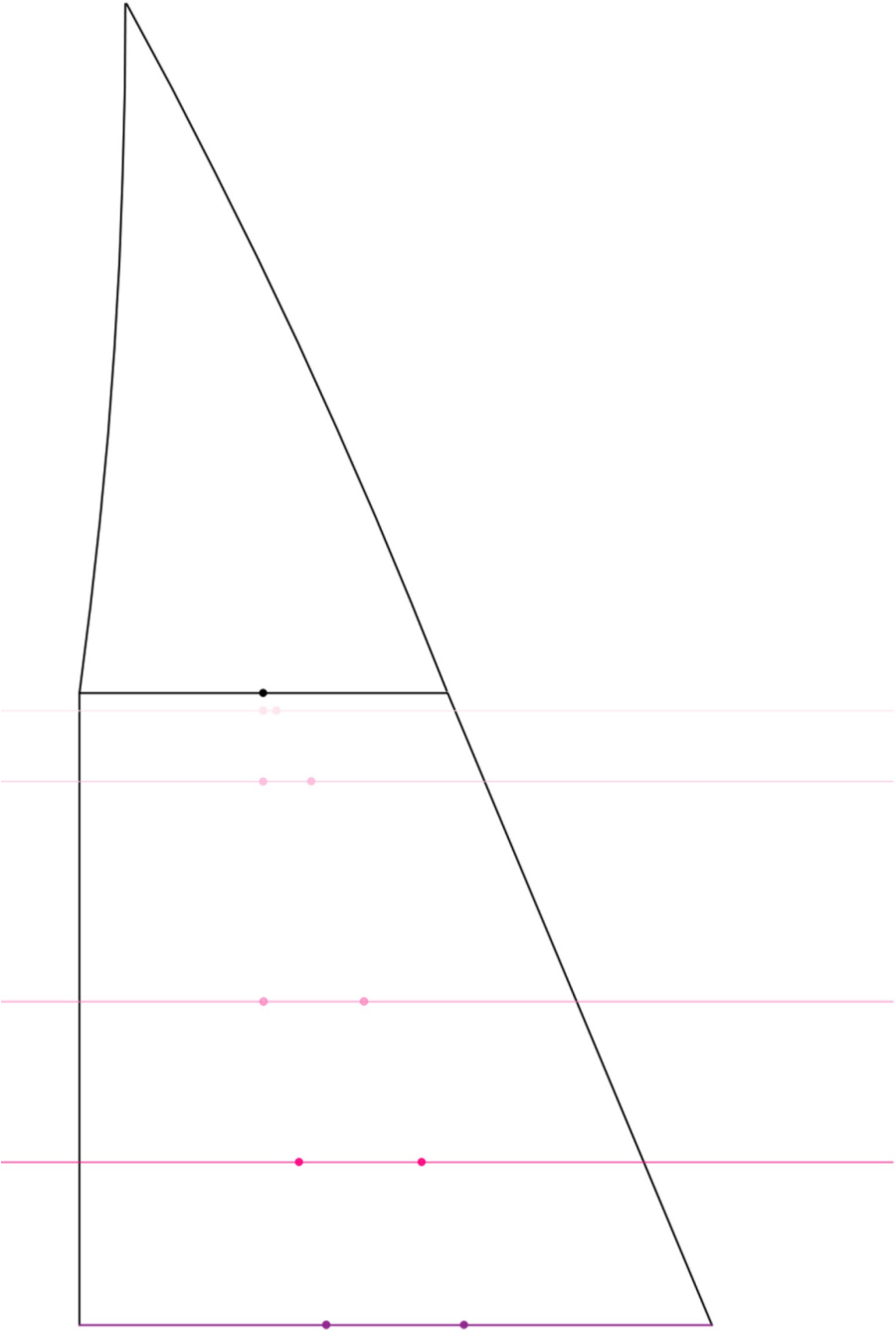
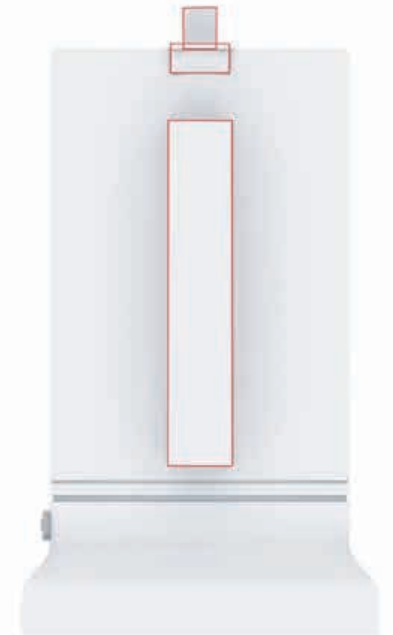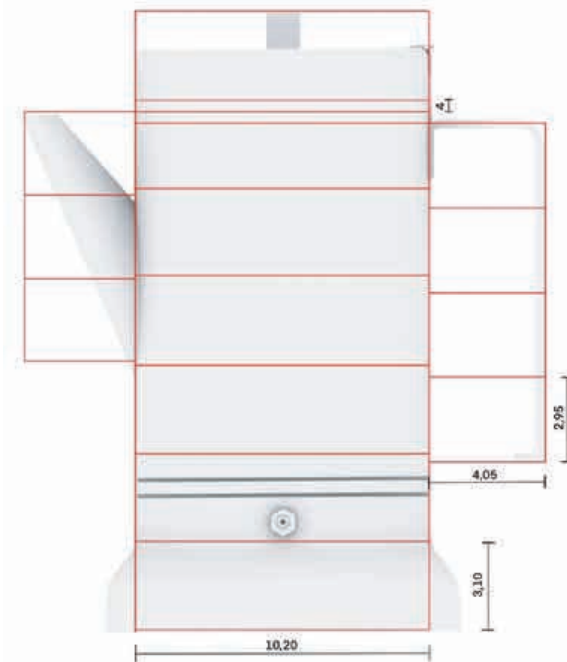Luana Sartiano

Gli studenti
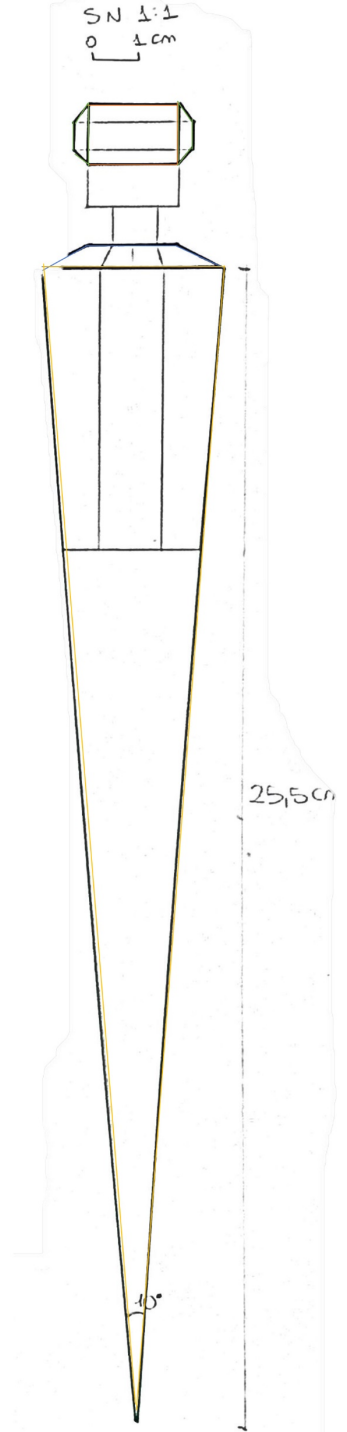
Matteo Massenzi, Ilaria Palumbo

Gli studenti

Simone Nicolò

Gli studenti

r = 6.3 cm

r = 6.3 cm

r = 6.45 cm

r = 6.45 cm

r = 3 cm

r = 8.9 cm

r = 8.9 cm

r = 1.5 cm

r = 1.5 cm

r = 0.75 cm

r = 0.15 cm

r = 2 cm

r = 1.05 cm

r = 2.05 cm

r = 1.05 cm
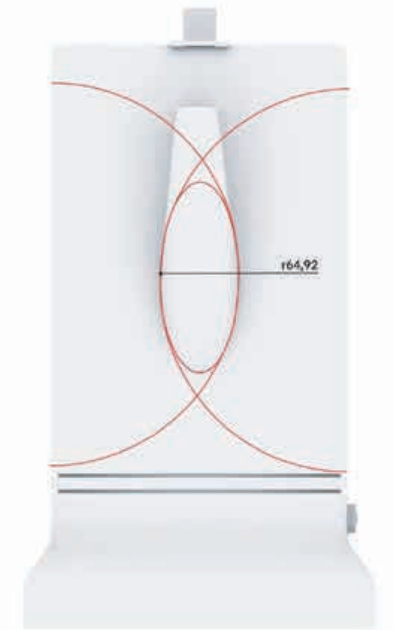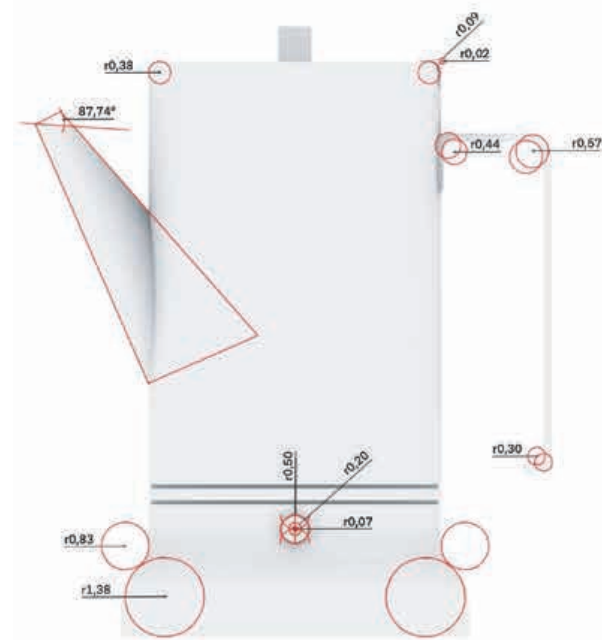
Pietro Marino

Gli studenti
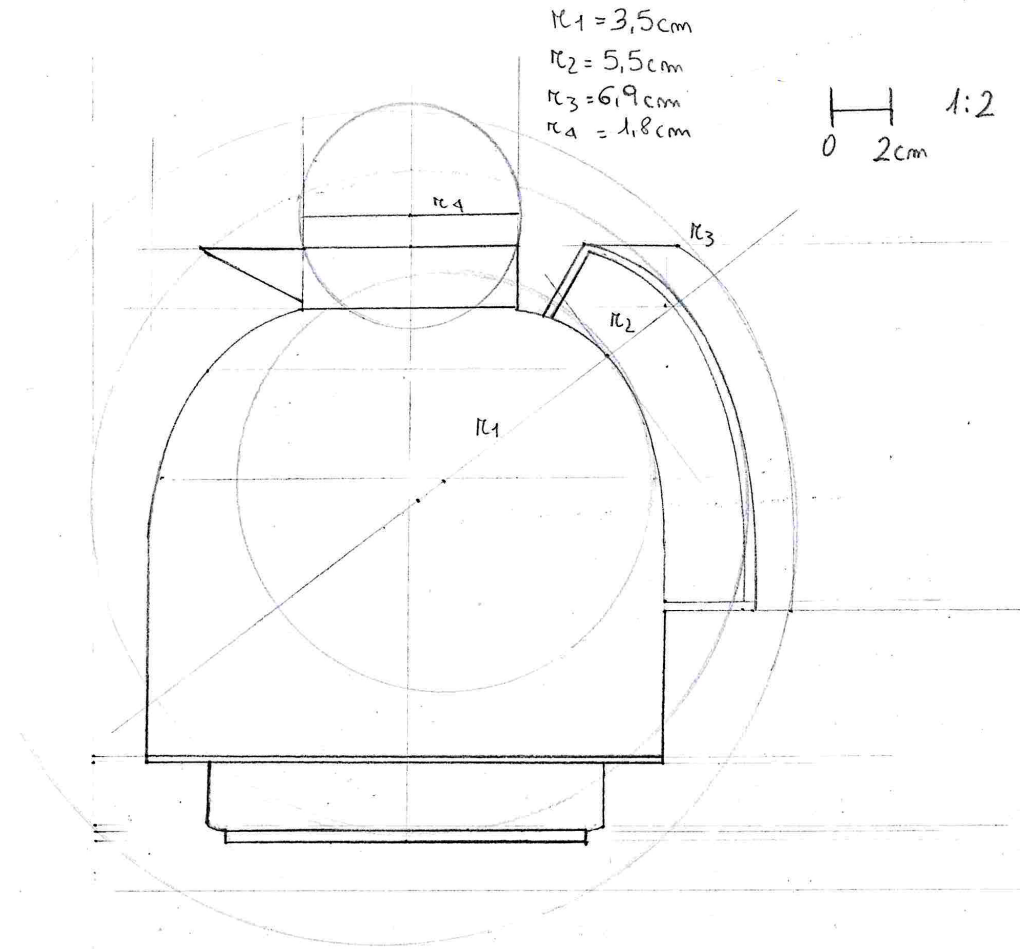
Angela Polimeni, Domenica Morabito