

# Drawing a Pentagon

Which form the faces [hedra] of the DoDecaHedron

## NAMES

DO-	2		PENTA-	5
DECA-	10		-GON	KNEES
-HEDRON	FACE		-ANGLE	ANKLES

ELEMENT	Tetrahedron	Octahedron	Icosahedron	Cube	Dodecahedron
Face type	Triangle 3	Triangle 3	Triangle 3	Square 4	Pentagon 5
# Hedra (faces)	4	8	20	6	12
# Lines (edges)	6	12	30	12	30
# Points (vertices) (# lines joining)	4 (3)	6 (4)	12 (5)	8 (3)	20 (3)

Note the special contrast / relation between **Octahedron** and **Cube** – one could fit inside the other with a point in the middle of every face of its conjugate form.

The same is true of the **Icosahedron** and the **Dodecahedron**.

A series of five models showing the metamorphosis between an  
\* **Octahedron**  
in Yellow  
to a  
\* **Cube**  
in Blue.



Octahedron

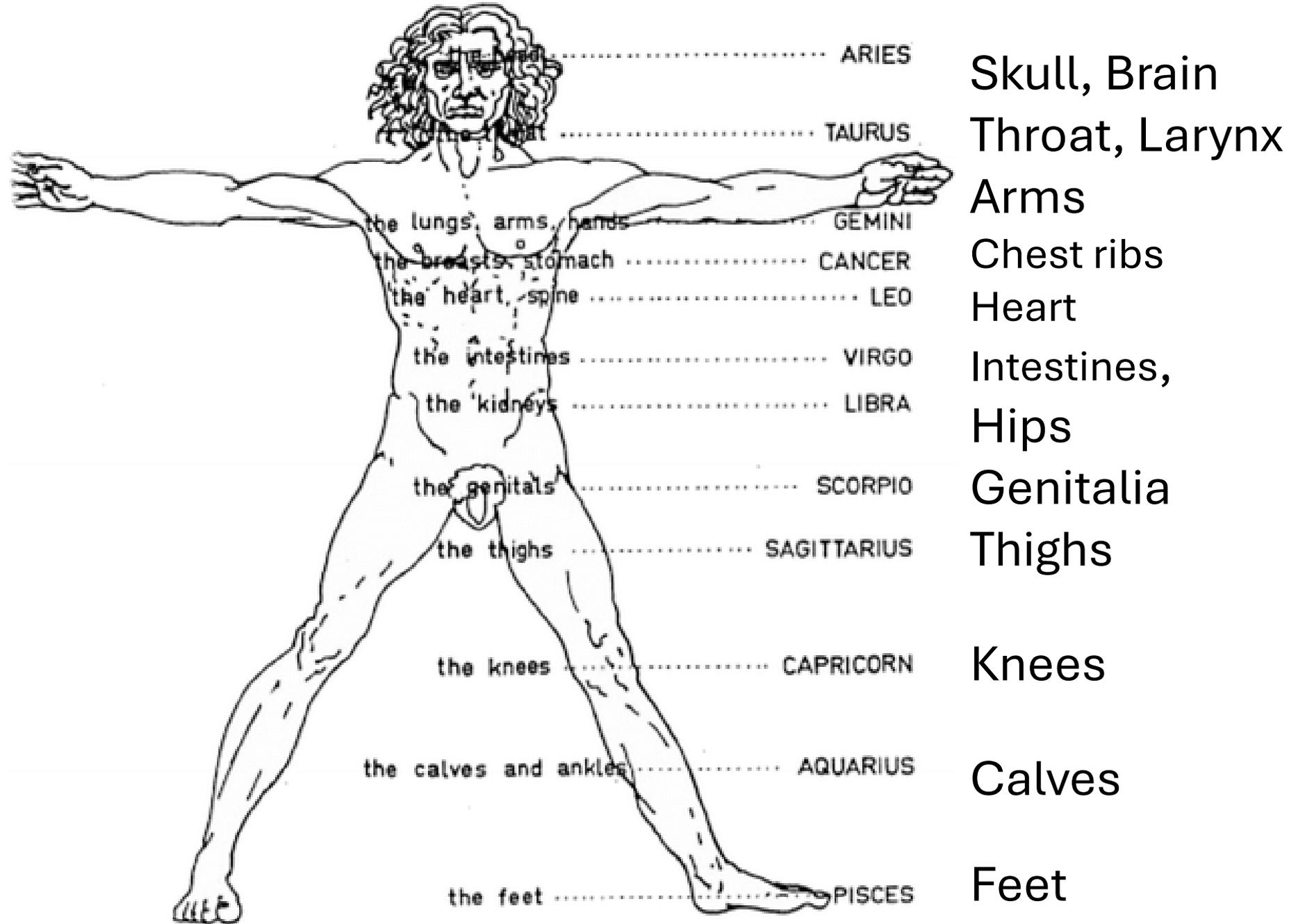
Truncated  
Octahedron

Cuboctrahedron

Truncated  
Cube

Cube

A diagram showing a relationship between the Macrocosmic Universe 12 Zodiac signs and the Microcosmic Human Being known from ancient times



Anatomical  
Zodiac Man  
from the [Très  
Riches Heures  
du Duc de  
Berry](#)

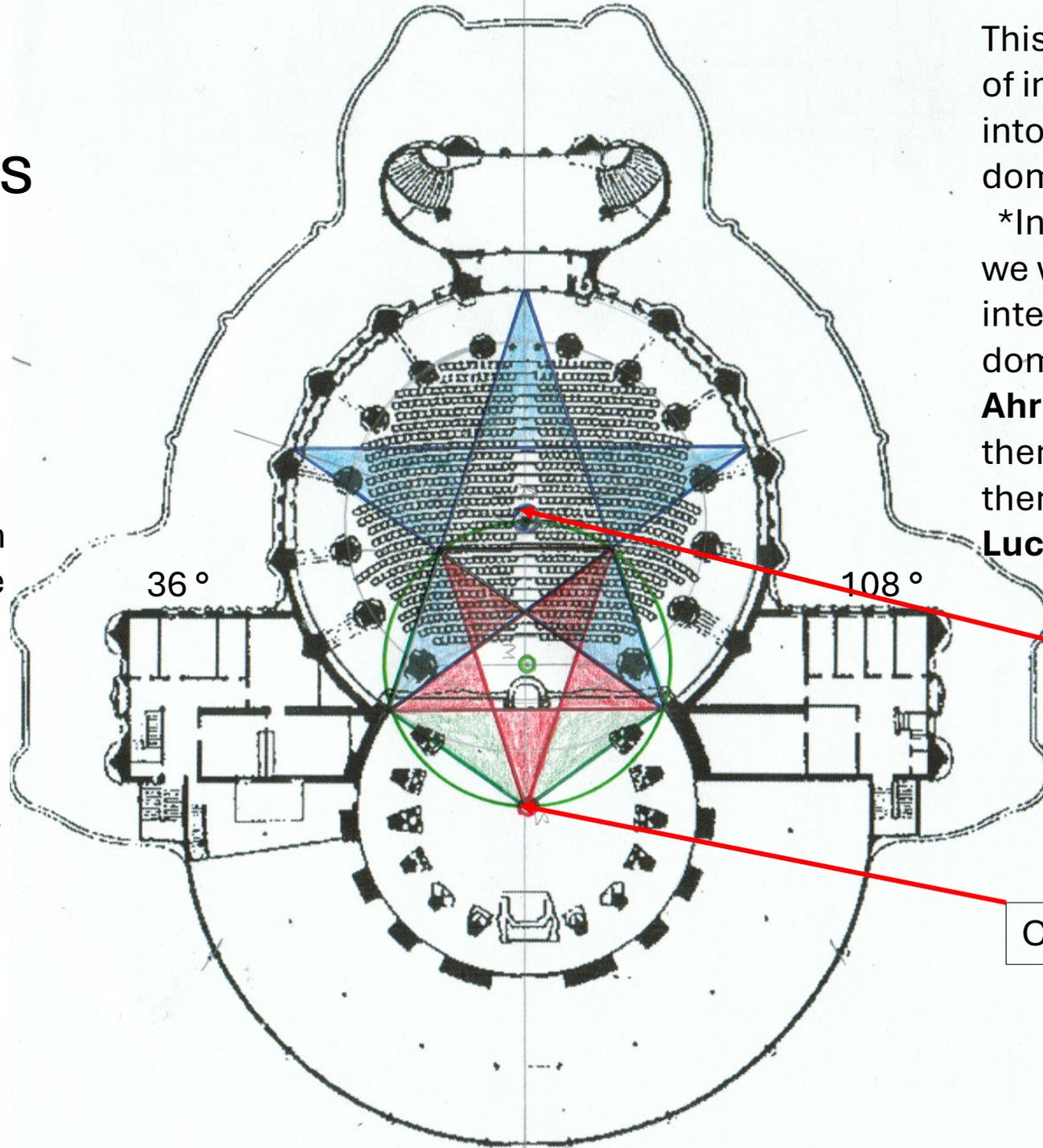


# Inscribed Pentagrams

The dividing line between the larger Auditorium (earthly) dome and the smaller Stage (cosmic) dome is the base of a pentagram (blue) fitting in the circle of the Auditorium.

The smaller pentagram (red) fits inside a circle that includes the centre of the Auditorium and the centre of the Stage.

The size of the two pentagrams are in the Golden Ratio.



This establishes an artistic balance of interpenetration of the two domes into each other. The surfaces of the domes are *mutually perpendicular*.

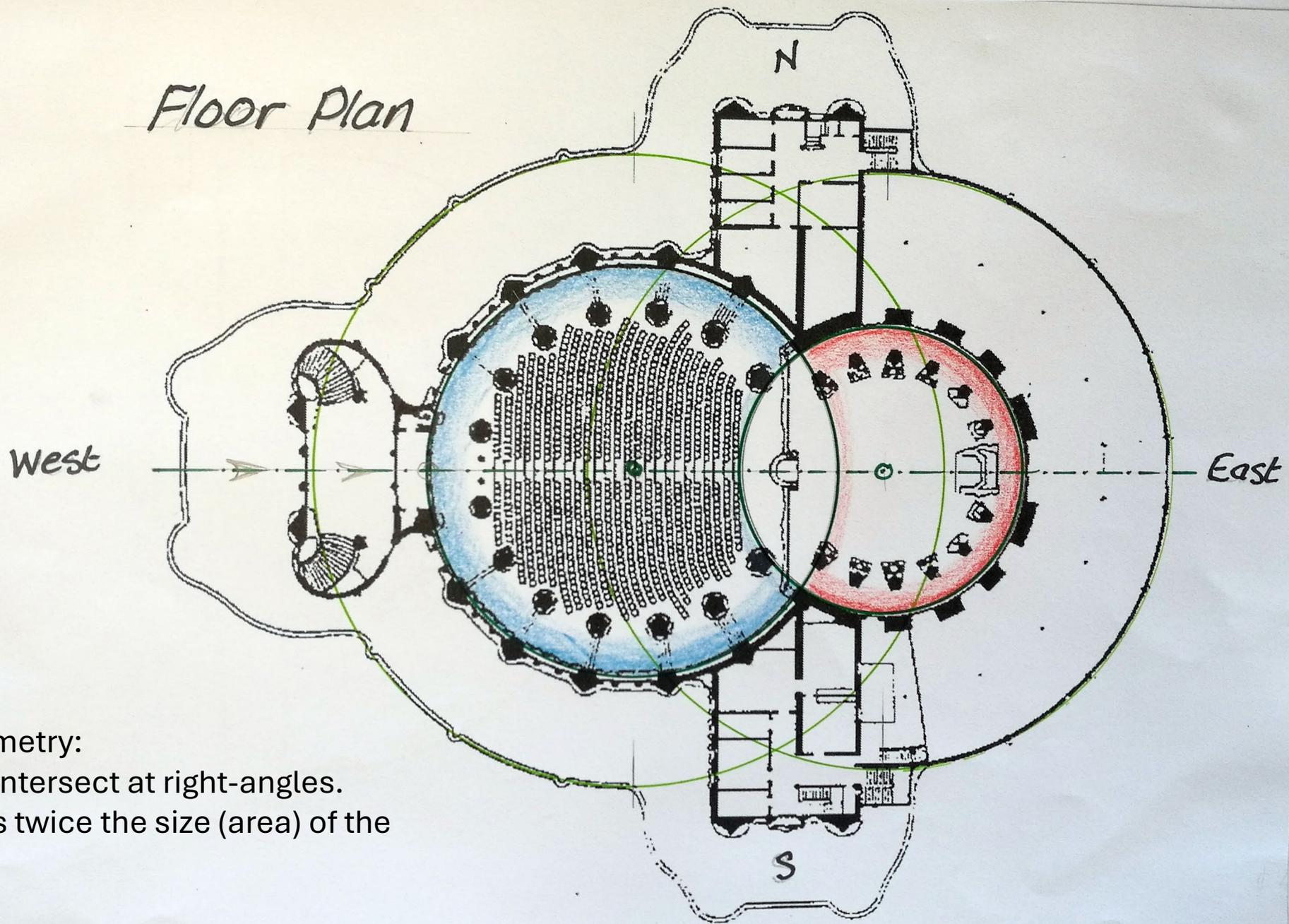
\*In CW275 Rudolf Steiner says: "If we were to cancel the interpenetration and separate the dome motifs, we move towards the **Ahrimanic** principle. If we bring them closer together, or overlap them completely, we approach the **Luciferic** principle."

4-1-1915

Centre of Auditorium

Centre of Stage

# Floor Plan



**Note the Geometry:**

1. The circles intersect at right-angles.
2. One circle is twice the size (area) of the other.

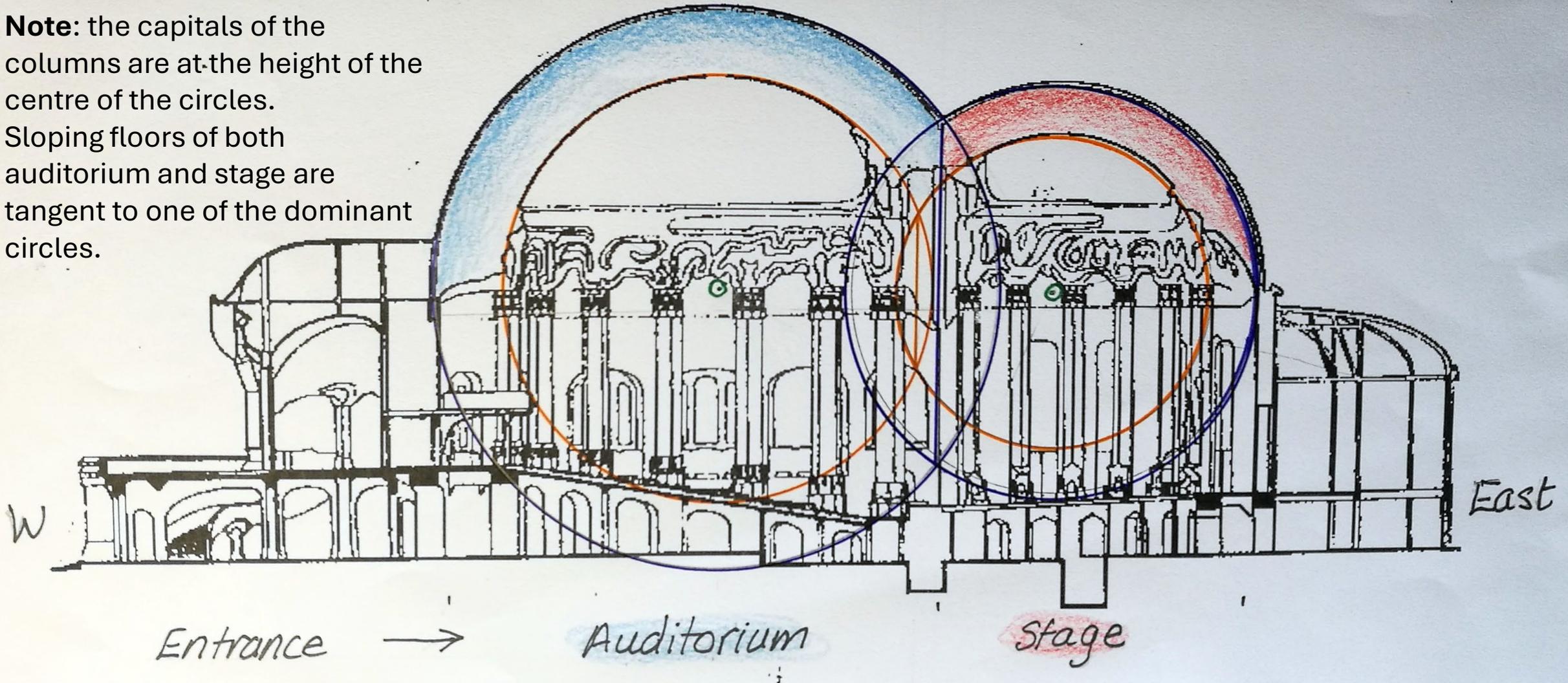
Entrance → Auditorium

Stage



# FIRST GOETHEANUM ~ W-E Centreline Section Elevation

**Note:** the capitals of the columns are at the height of the centre of the circles.  
Sloping floors of both auditorium and stage are tangent to one of the dominant circles.



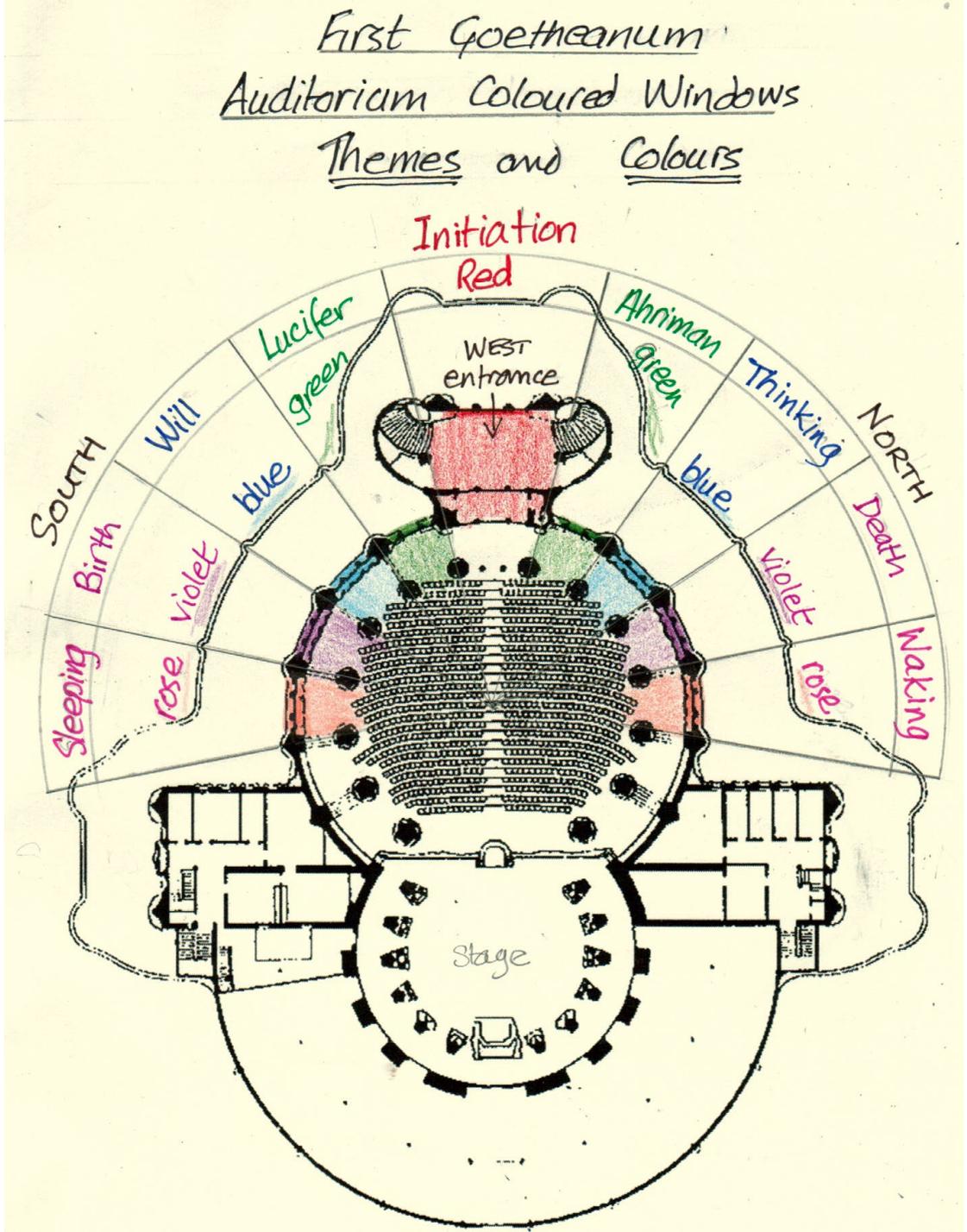
# Illustrated Themes

On the domed ceiling over the Auditorium coloured murals depicted 12 scenes from the **evolution of Humanity on Earth**.

Pictures on the domed ceiling over the Stage and the columns of the auditorium depicted the **evolution of the Solar System**.

For someone sitting in the Auditorium the space was lit by 4 pairs of coloured windows on either side (left/North and right/South) ranging from green nearest to the Western entrance, through blue, violet to rose/magenta nearest the stage. The themes related to the **life evolution of individual human beings**. Behind the seated person, over the Western entrance was a Red window depicting the theme of

Colour	Right/South	Left/North
Green	Lucifer	Ahriman
Blue	Will	Thinking
Violet	Birth	Death
Rose	Sleeping	Waking



# Geometrical Drawing

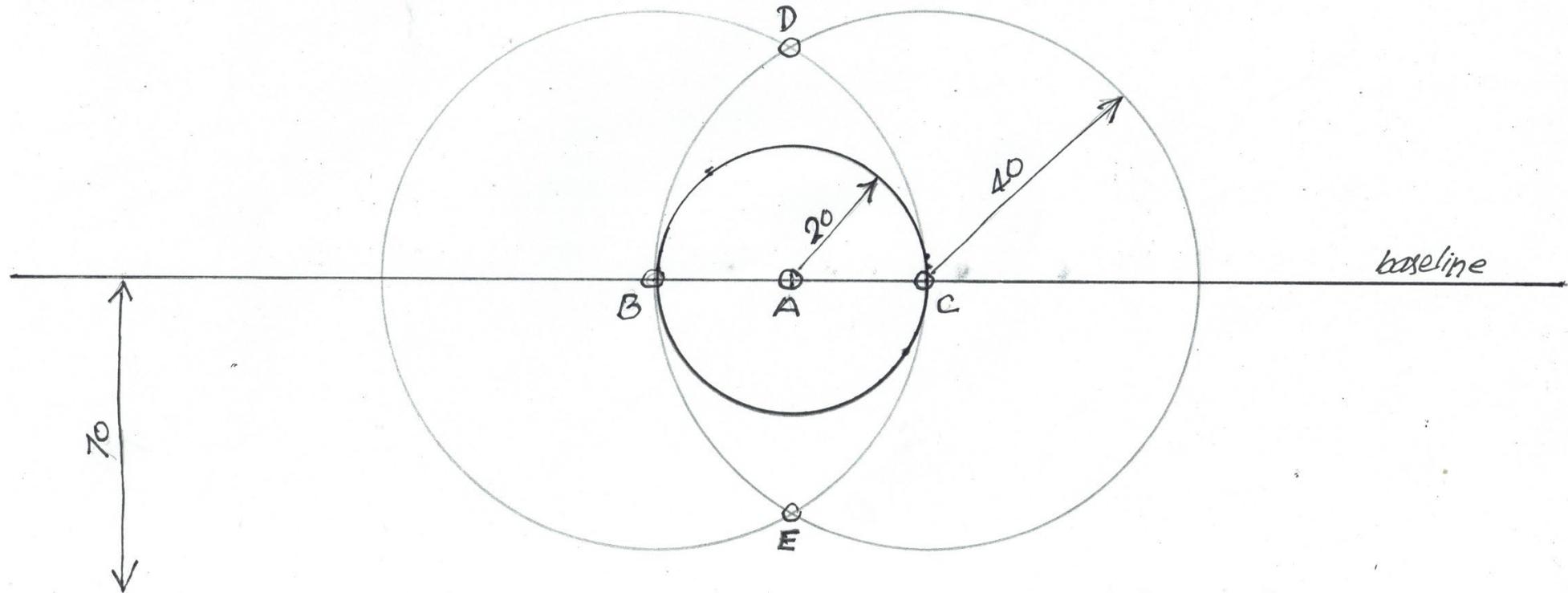
We can idealise our position in the world:

- ❑ We stand on the earth – a flat non-undulating horizontal **Plane**.
- ❑ Our body is an upright column supporting our head – this can be idealised to a vertical **Line**, reaching from our ‘star’ above to the centre of the earth.
- ❑ This line intersects the earth plane in a **Point**.
- ❑ **WILL:** We can spin or **rotate through an *angle*** in the **point**; OR
- ❑ We can **move a *distance*** along a **curved (circle) or straight line**.

# Moving a Pentagon dynamically:

- This is a rhythmical process:
- Walk 5 steps in a s.traight line; stop.
- Rotate  $1/5$  (one fifth) of a turn in a sunwise direction;
- Repeat 5 times – you should now be back where you started, having completed the circuit. =====
- We will now draw the form by considering its symmetrical character – in the process we create regular triangle, square and hexagon.

- 1a. A4 paper in landscape position, draw horizontal line 70 mm from base. Centre-point A
- 1b. Set compass to 20 mm. Draw circle with centre A, radius 20 mm. A:20
- 1c. Where circle A:2 cuts line mark points B+C. Draw two circles B:4 and C:4
- 1d. These circles intersect @ D above + E below

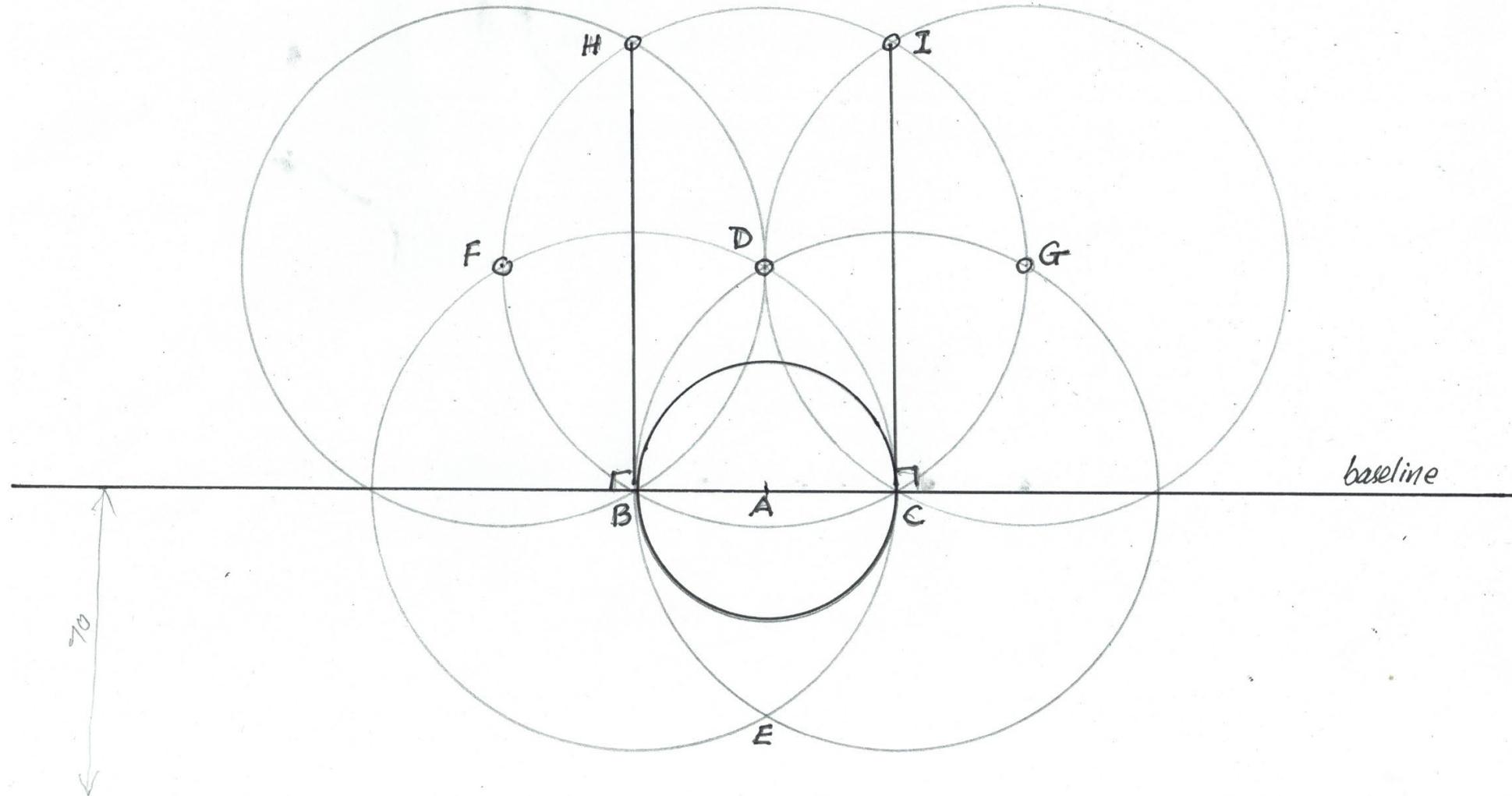


2a Draw circle D:4. Mark intersection points F+G

②

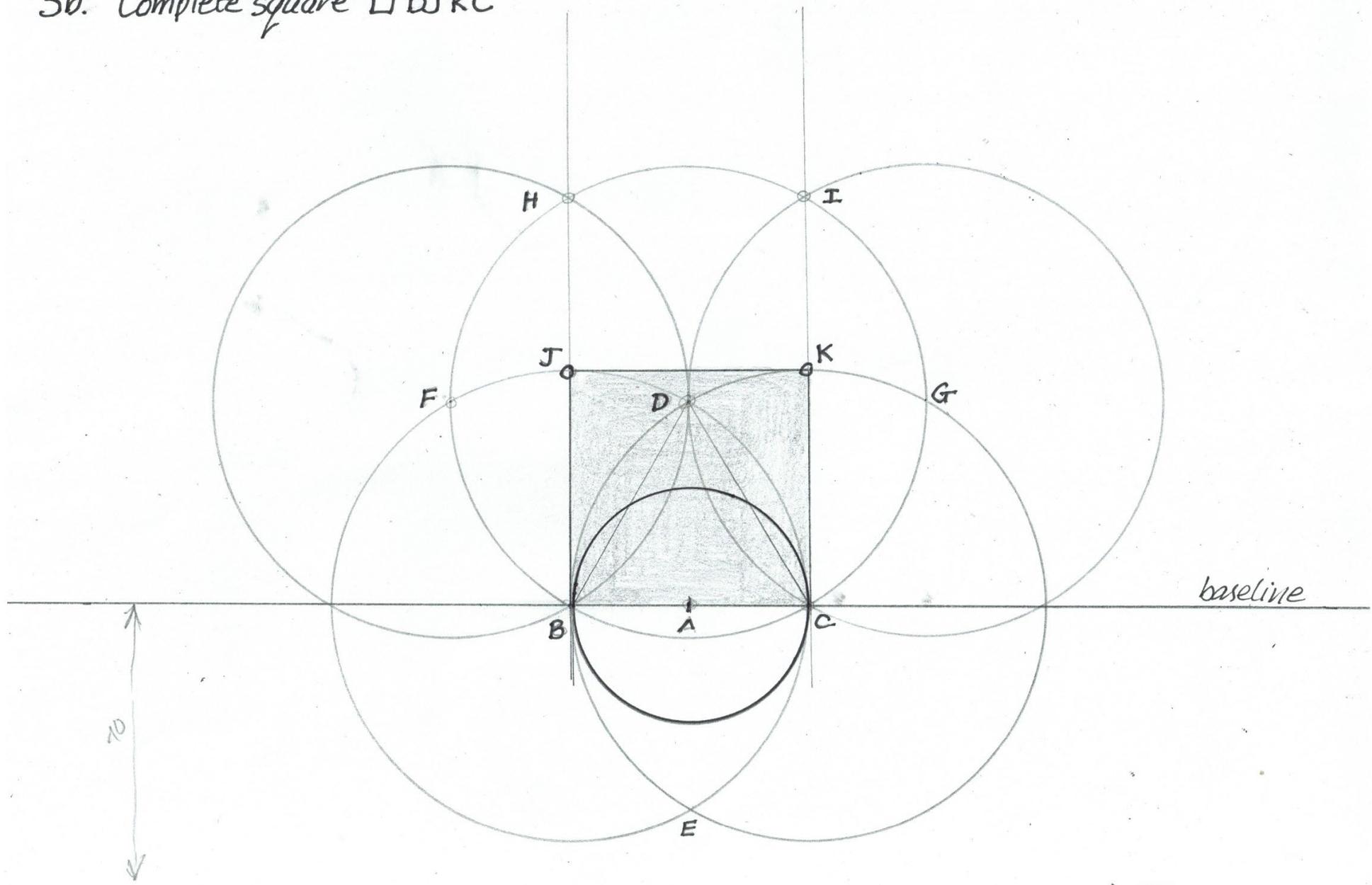
2b Draw two circles F:4 and G:4. Mark intersection points H+I

2c Note that, by symmetry, H + I are vertically above B + C (uprightness)



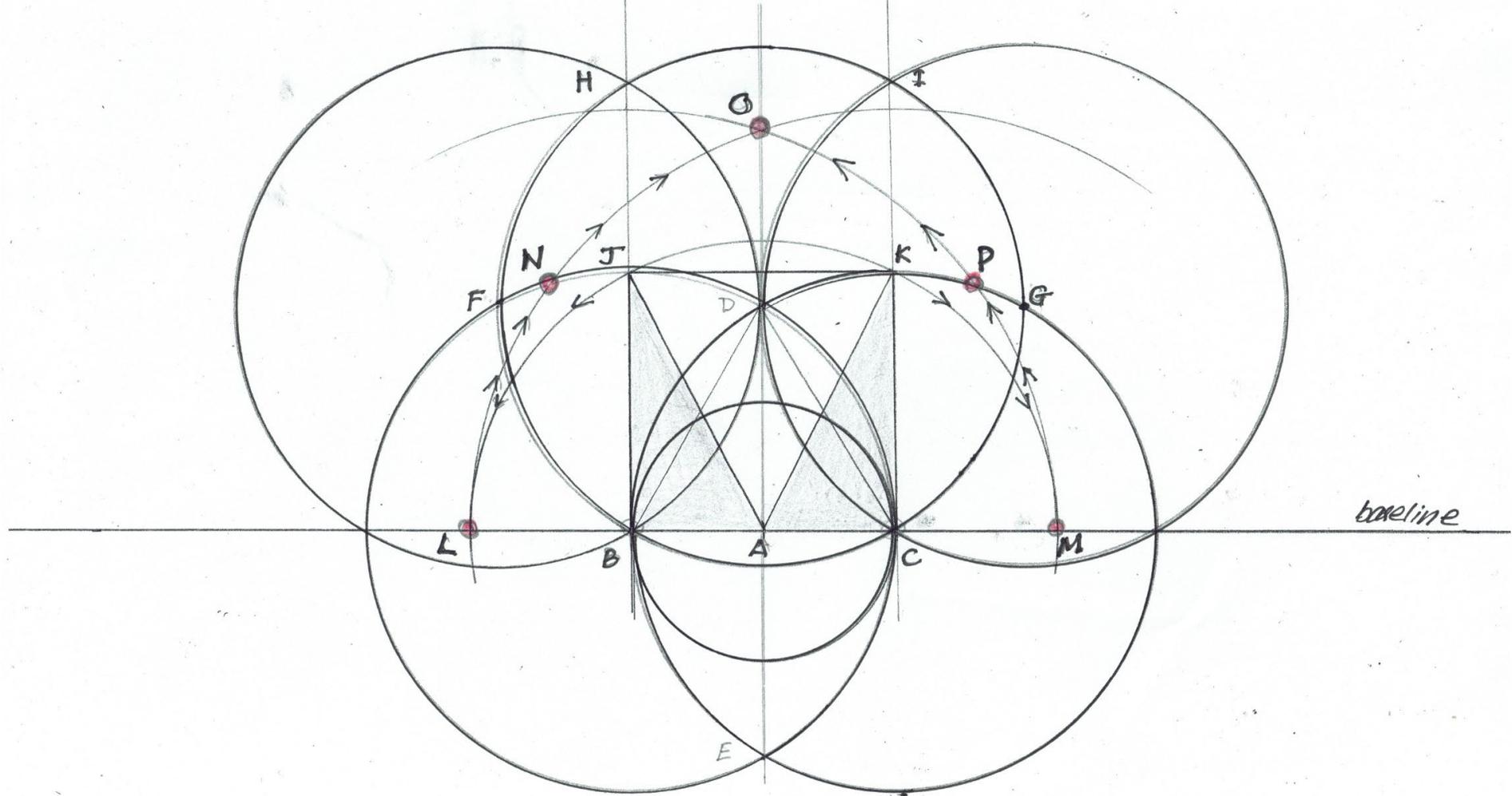
- 3a. Mark where vertical lines  $\overline{BH}$  +  $\overline{CI}$  cut circles  $B:4$  +  $C:4$  as  $J$  +  $K$   
 3b. Complete square  $\square BJKC$

3

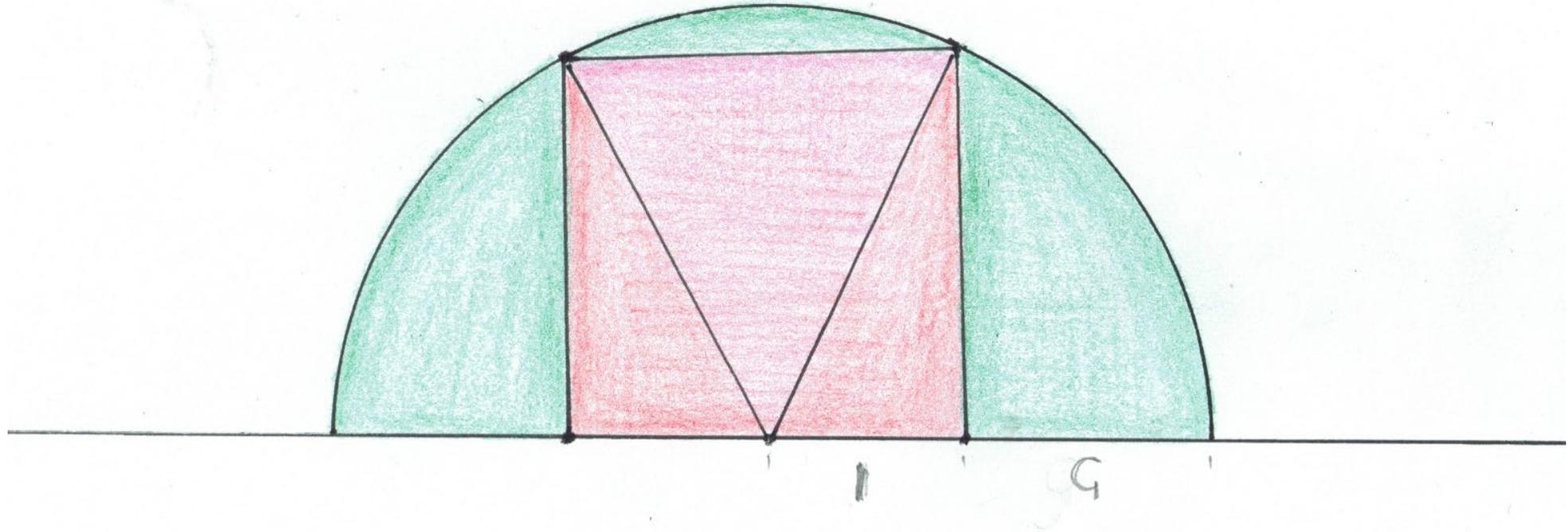


- 4a Draw the diagonals  $\overline{AJ}$  +  $\overline{AK}$  of the half-squares. Its length is  $2 \times \sqrt{5} \text{ mm}$
- 4b Draw semicircle A:  $\overline{AJ}$ , which cuts baseline @ L + M
- 4c Draw two arcs B:  $\overline{BM}$  + C:  $\overline{CL}$  to intersect each other above @ O
- 4d These two arcs cut circles B:  $\phi$  + C:  $\phi$  @ N + P

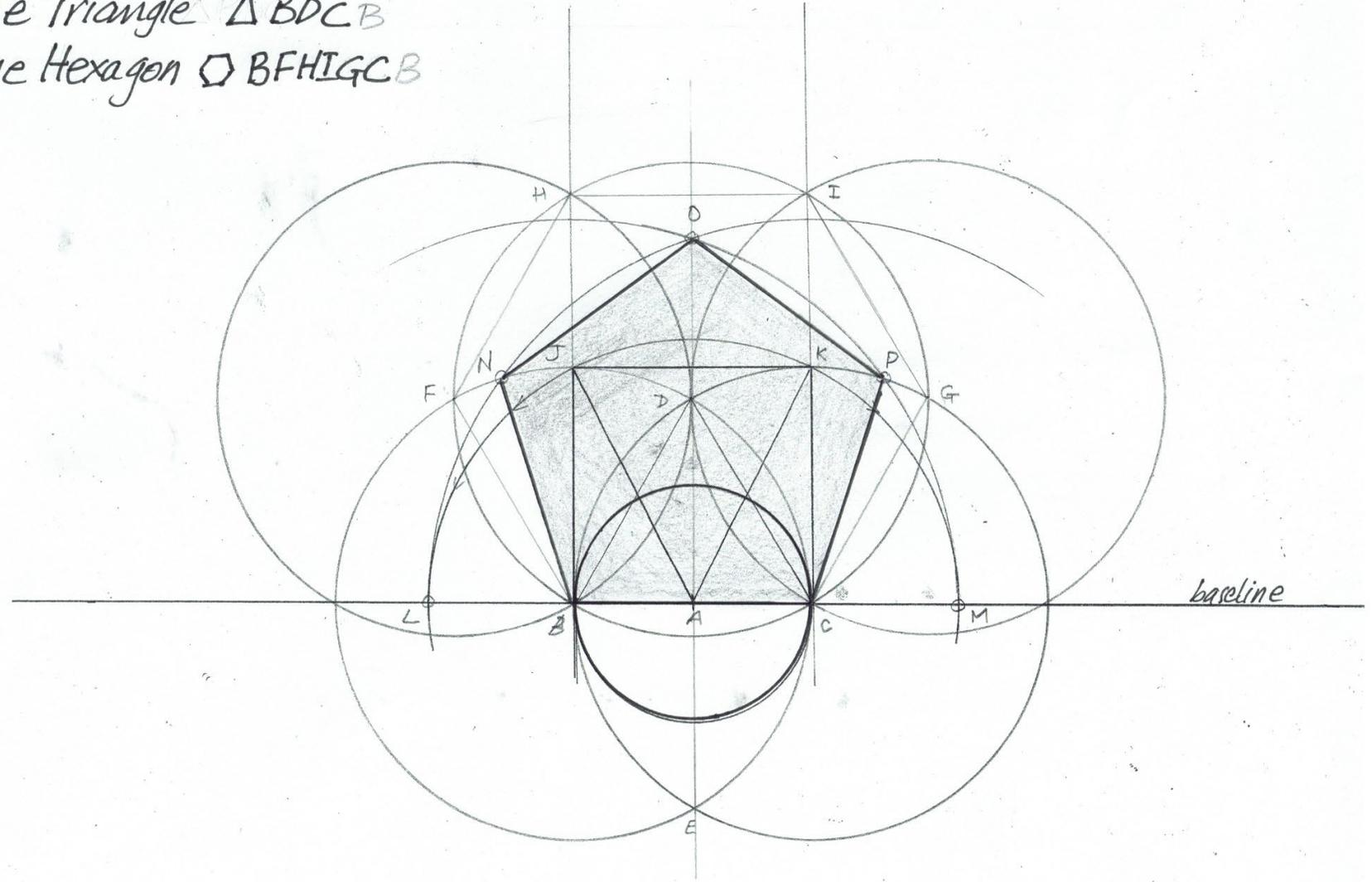
④



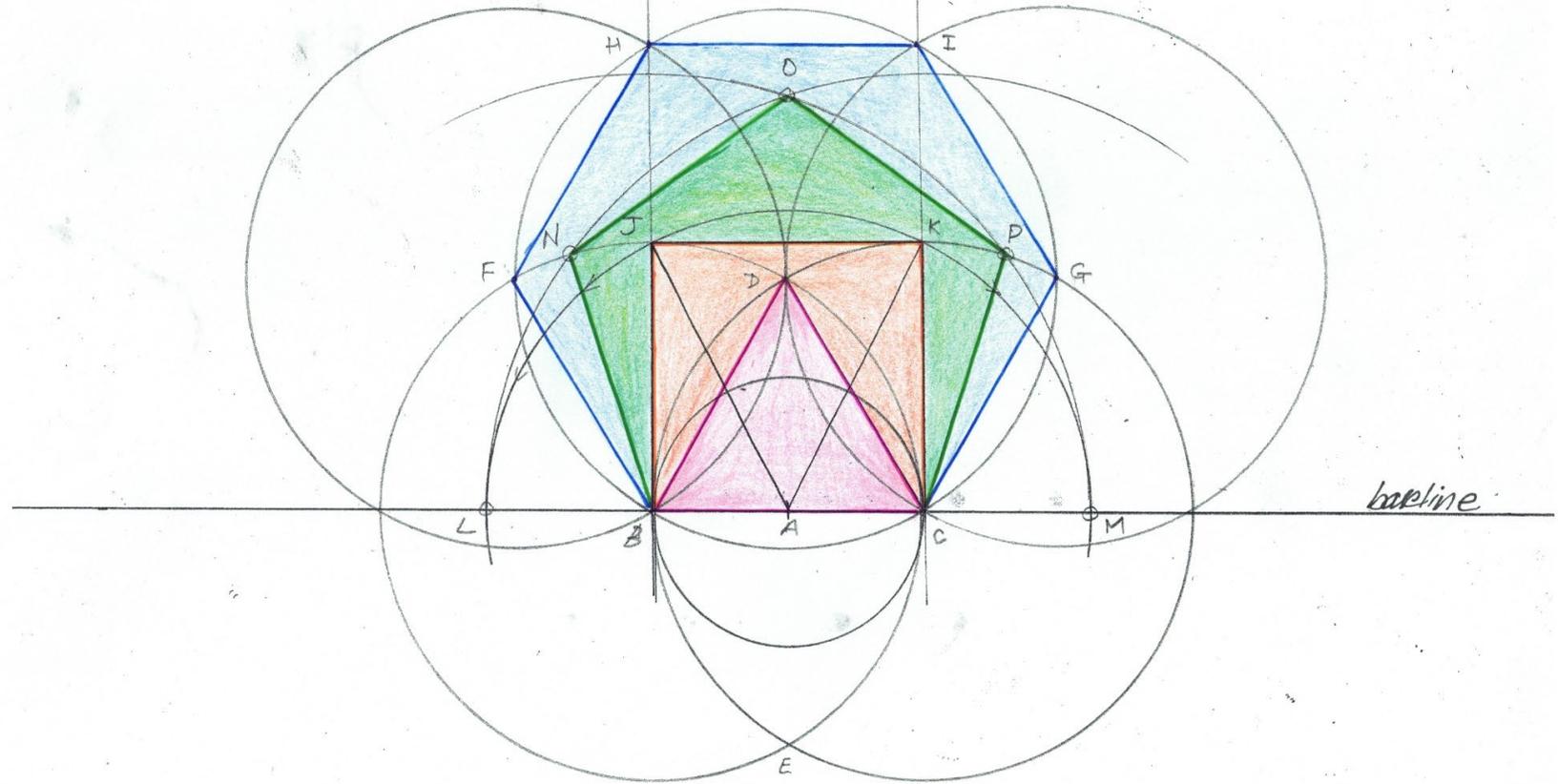
A Square within a Semicircle  
= the signature of the Golden Ratio =



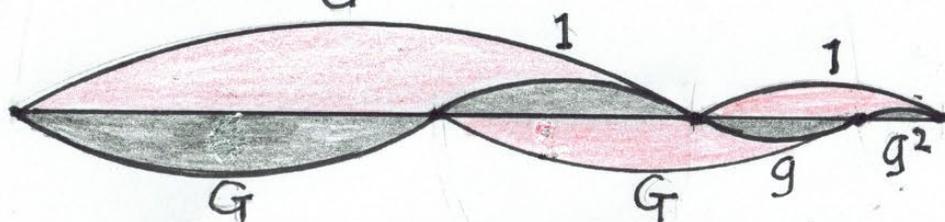
- 5a Outline Pentagon  $\square$  BNOPCB
- 5b Outline Triangle  $\triangle$  BDCB
- 5c Outline Hexagon  $\square$  BFHIGCB



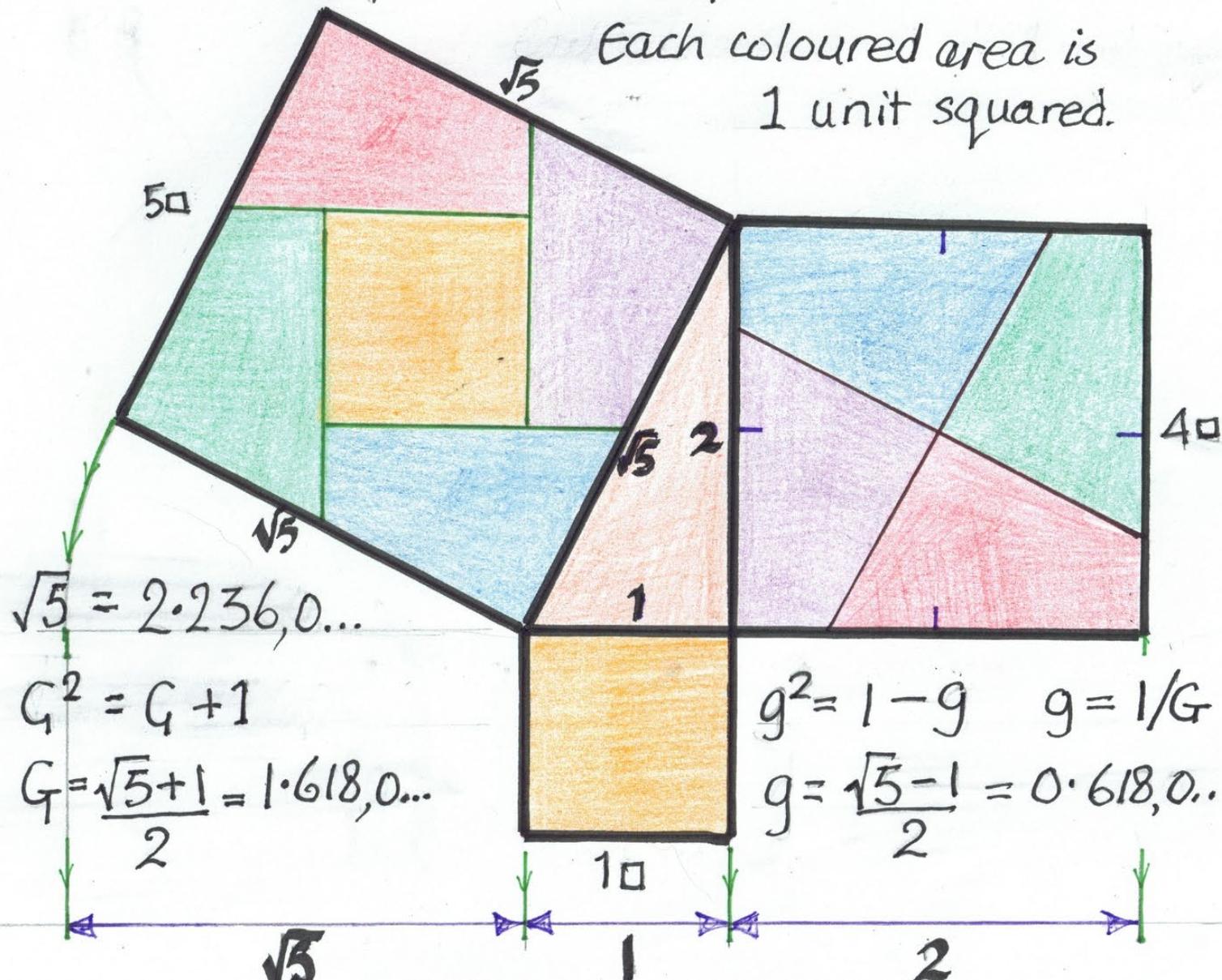
- 6a Colour, or highlight in some way, the spaces of triangle, square, Pentagon, Hexagon. (6)
- 6b. Alternatively, prick (with compass point) all the vertices (points) to other side of paper or a fresh page, and outline the form(s) there, without the construction lines.



The value "square Root of Five  $\sqrt{5}$  is key finding the Golden Ratio, an irrational number. It uses Pythagoras' theorem.



Each coloured area is 1 unit squared.



$$\sqrt{5} = 2.236, 0...$$

$$G^2 = G + 1$$

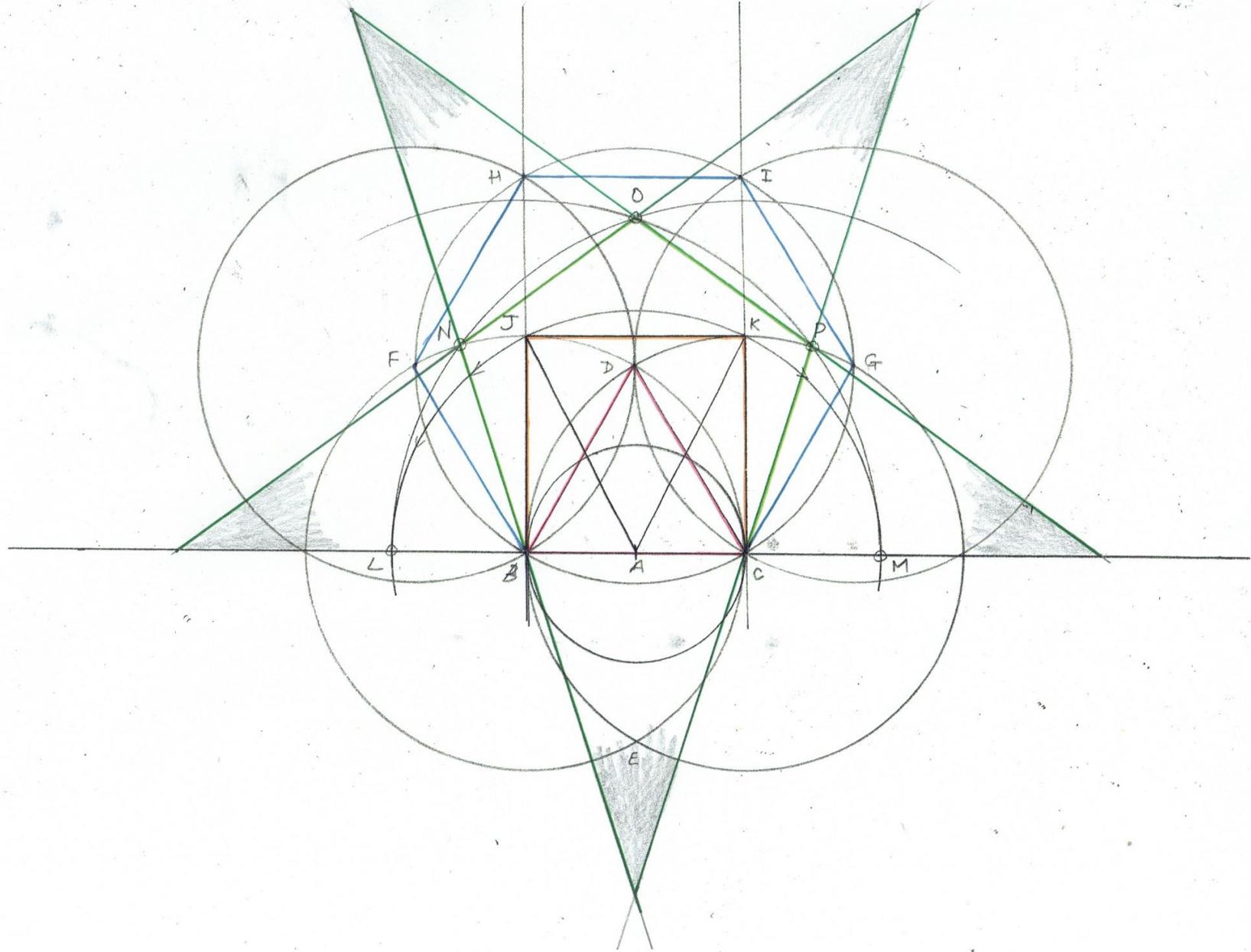
$$G = \frac{\sqrt{5} + 1}{2} = 1.618, 0...$$

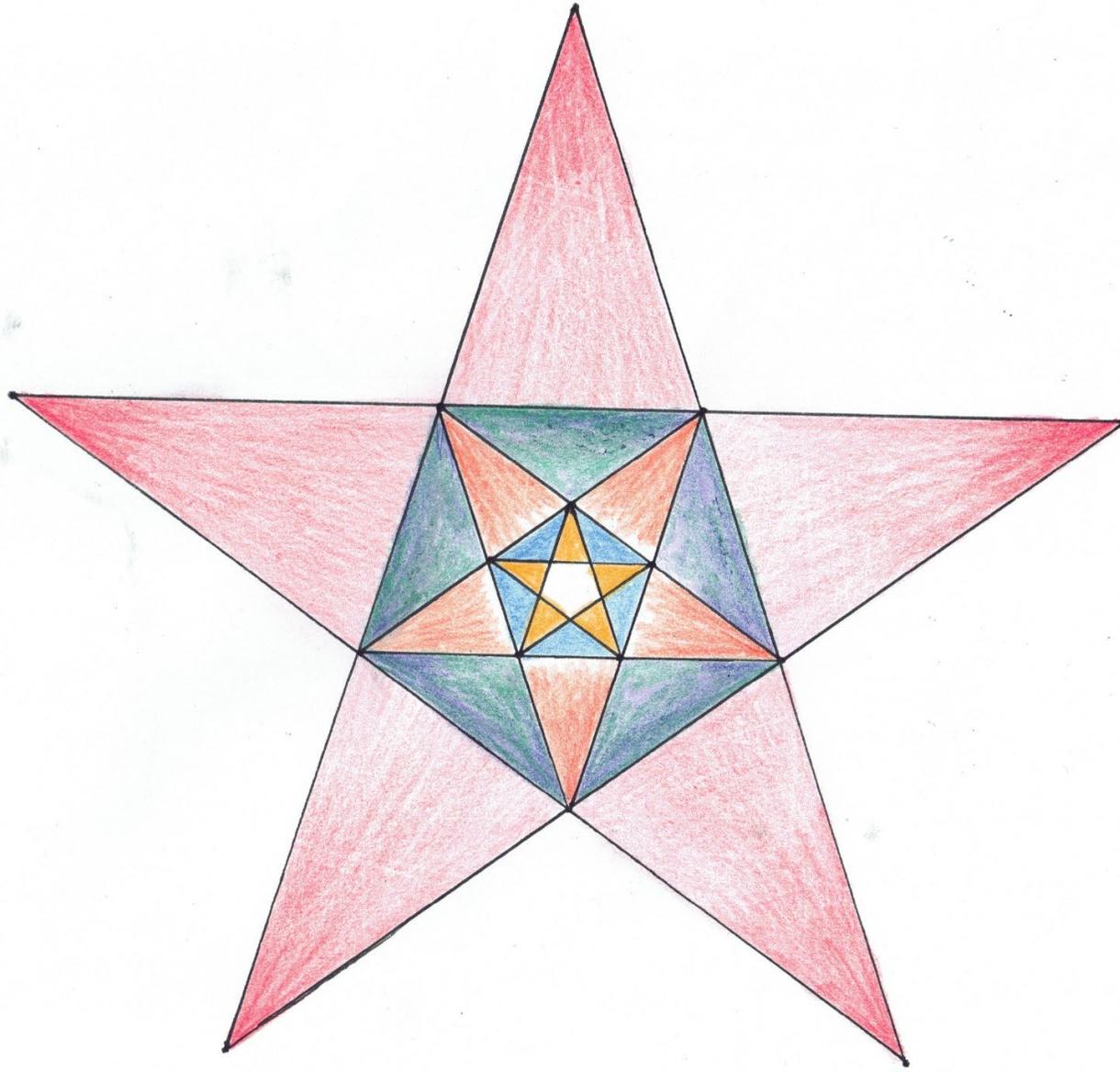
$$g^2 = 1 - g \quad g = 1/G$$

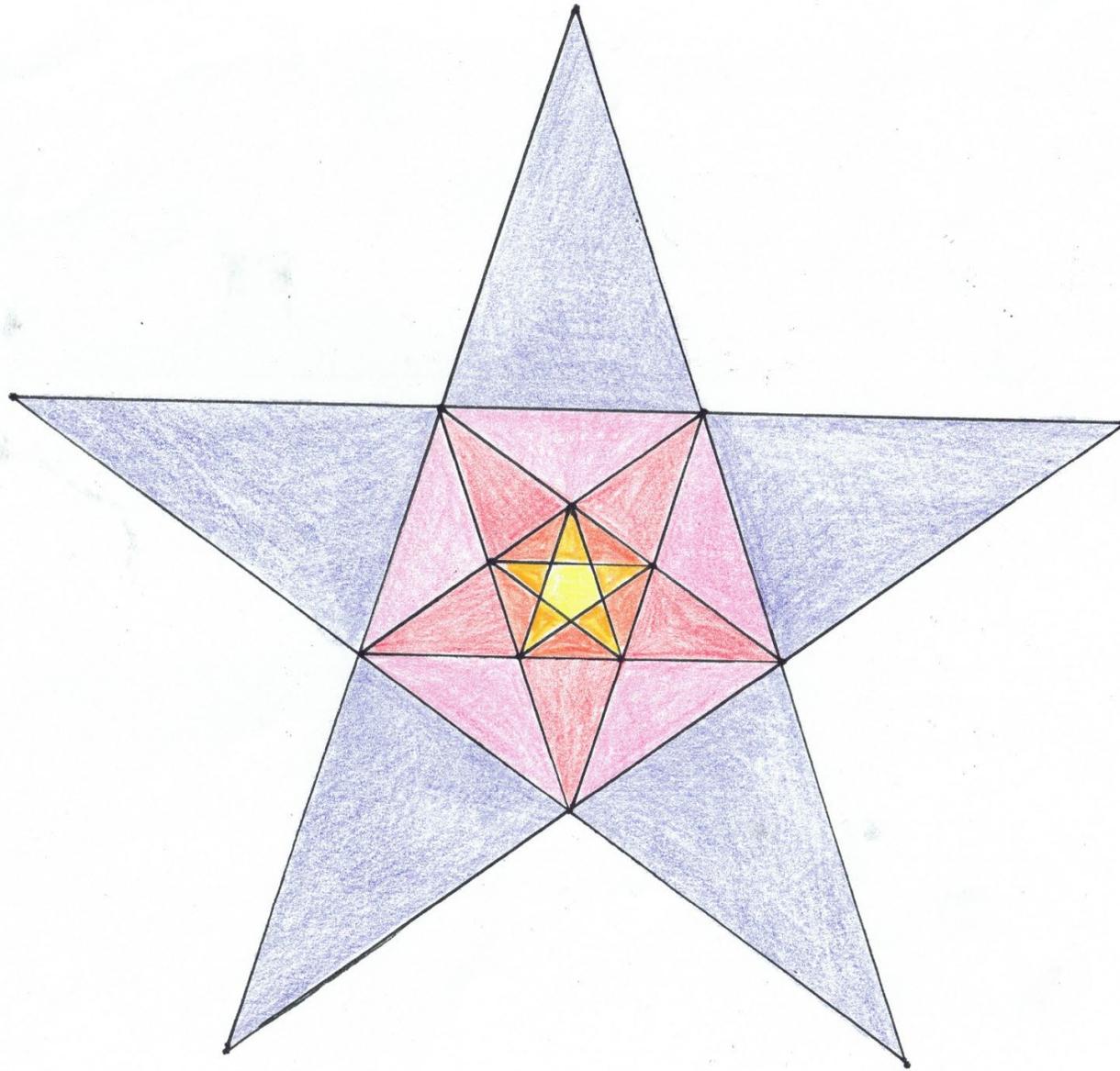
$$g = \frac{\sqrt{5} - 1}{2} = 0.618, 0...$$

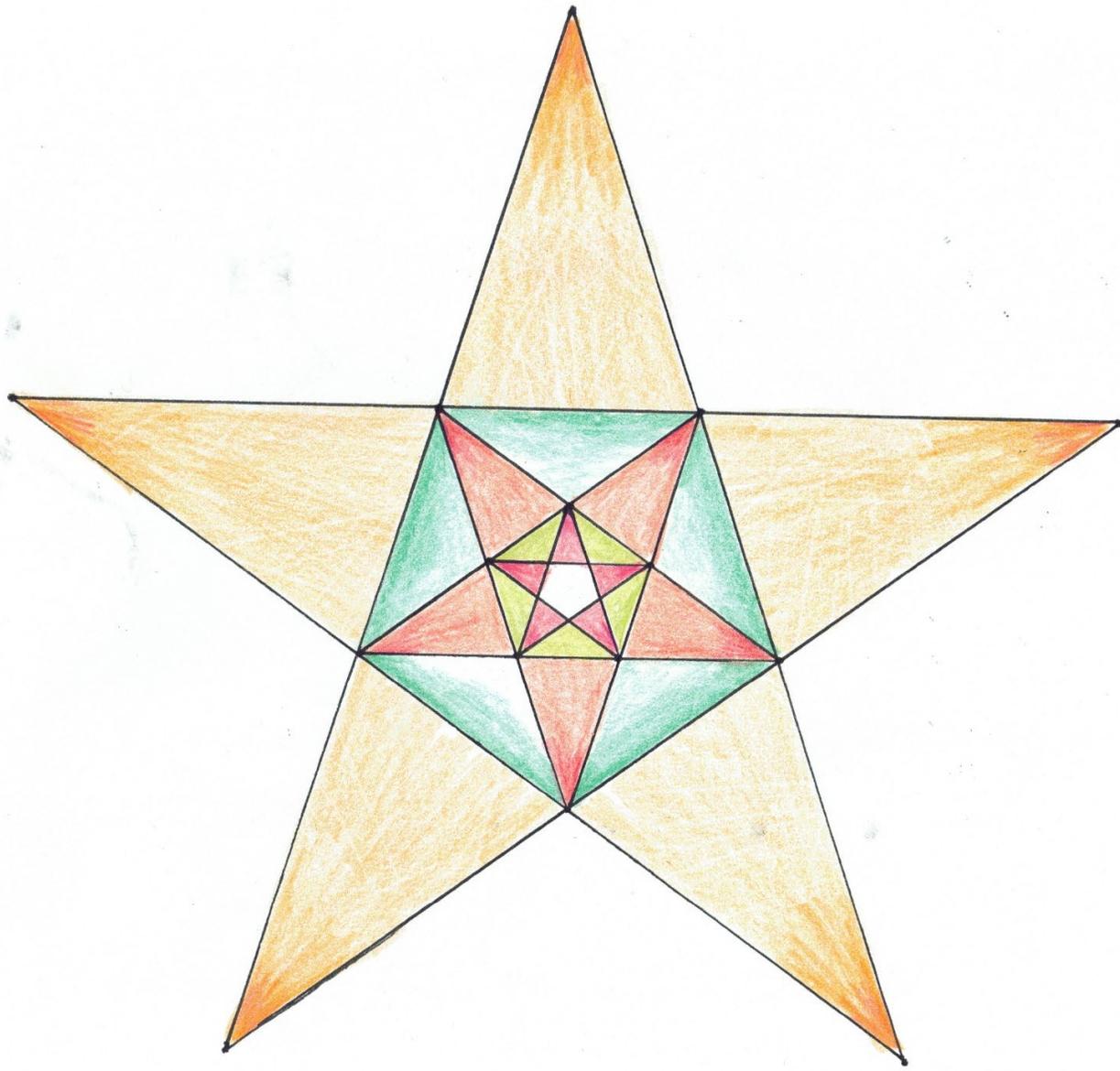
7a Extend the edges of the Pentagon to create a Pentagram star

7



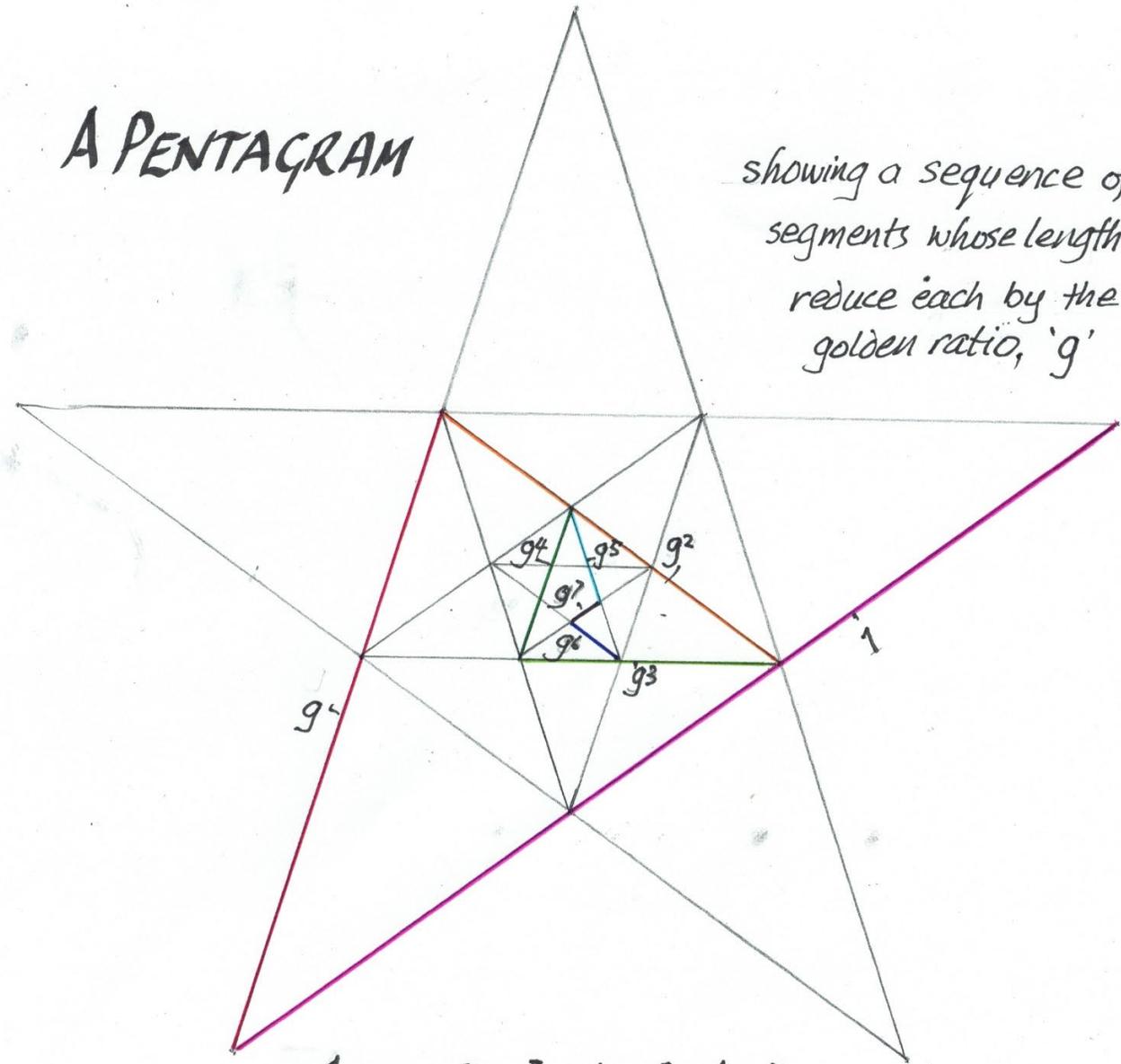






# A PENTAGRAM

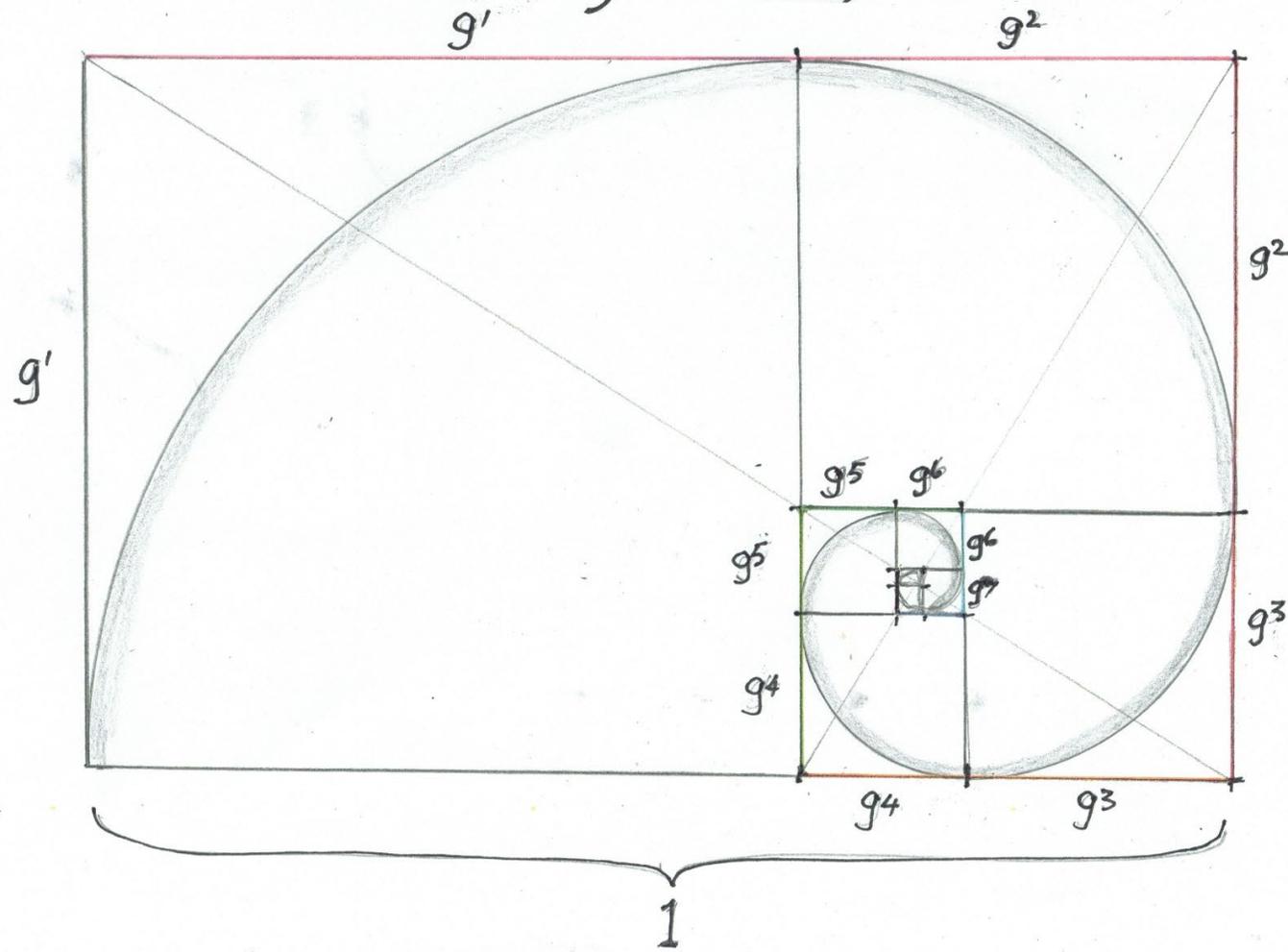
showing a sequence of 7 segments whose lengths reduce each by the golden ratio, 'g'

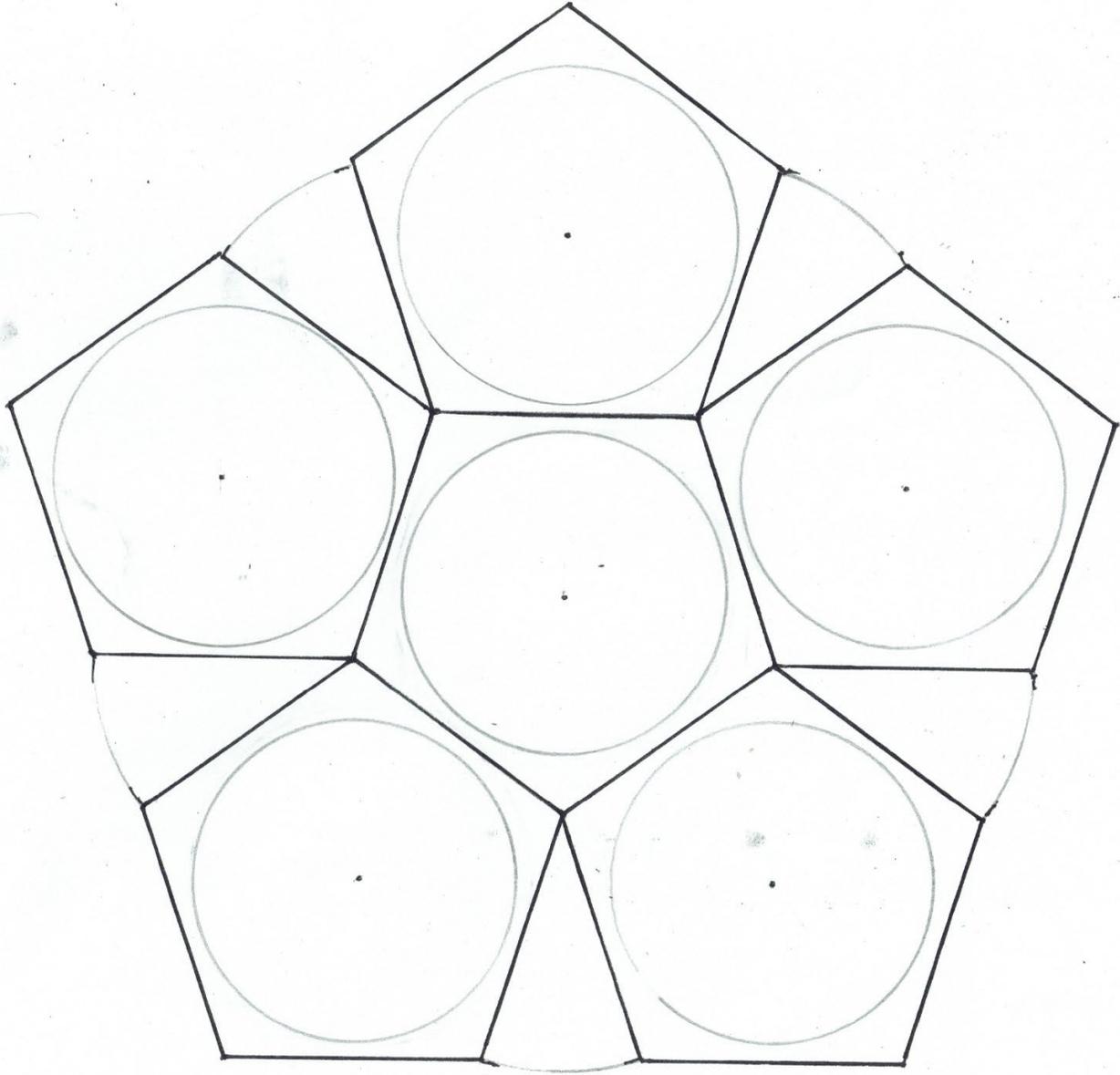


1, g, g<sup>2</sup>, g<sup>3</sup>, g<sup>4</sup>, g<sup>5</sup>, g<sup>6</sup>, g<sup>7</sup>

A Golden Rectangle enclosing a Golden Spiral  
(actually a Volute = a sequence of quarter circles  
- not a logarithmic spiral.)

9





*A Dodecahedron half-net.*