320 TRUGV

MON. FEB. 21

SPRING 2011

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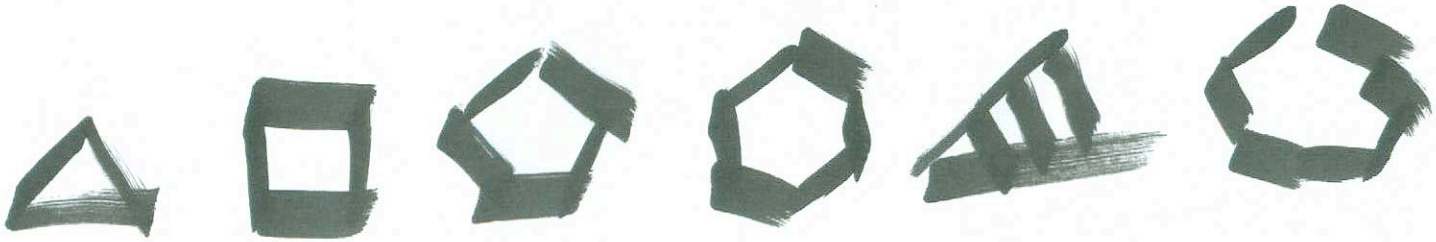

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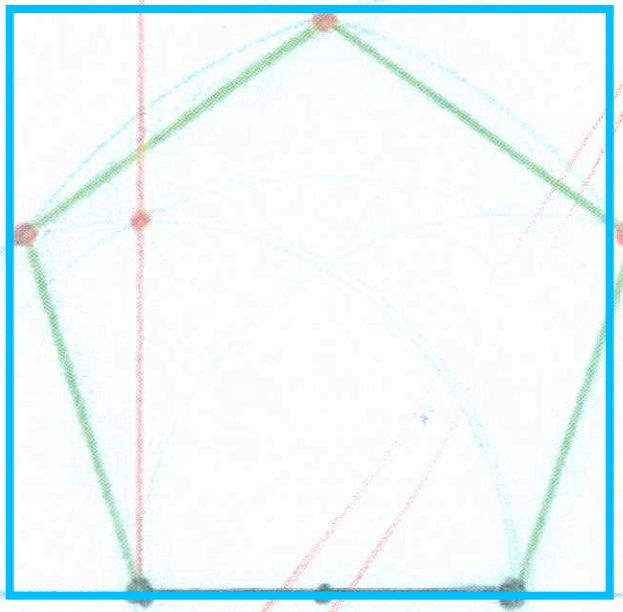

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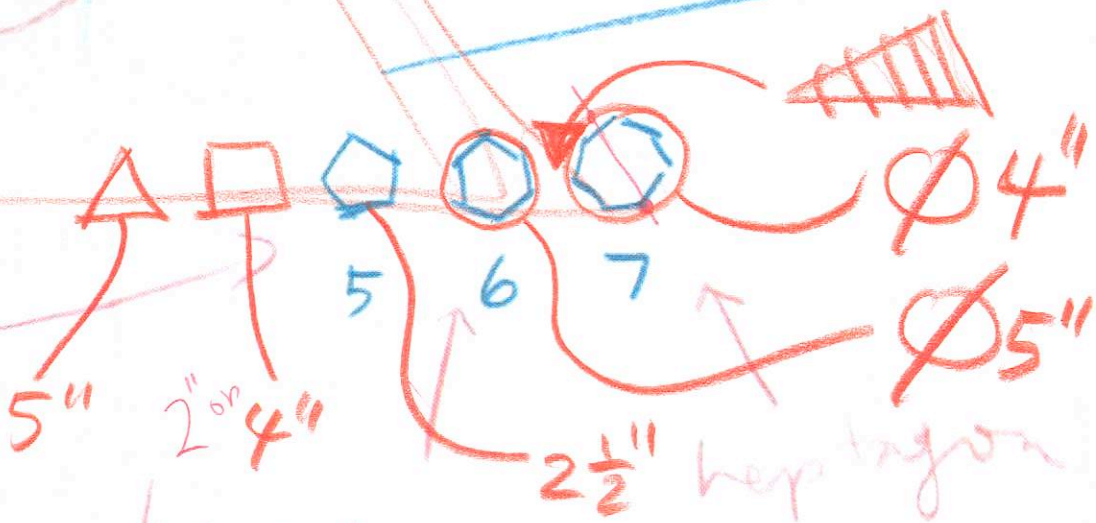
DAY 10

MONDAY

MARCH 1,

2010



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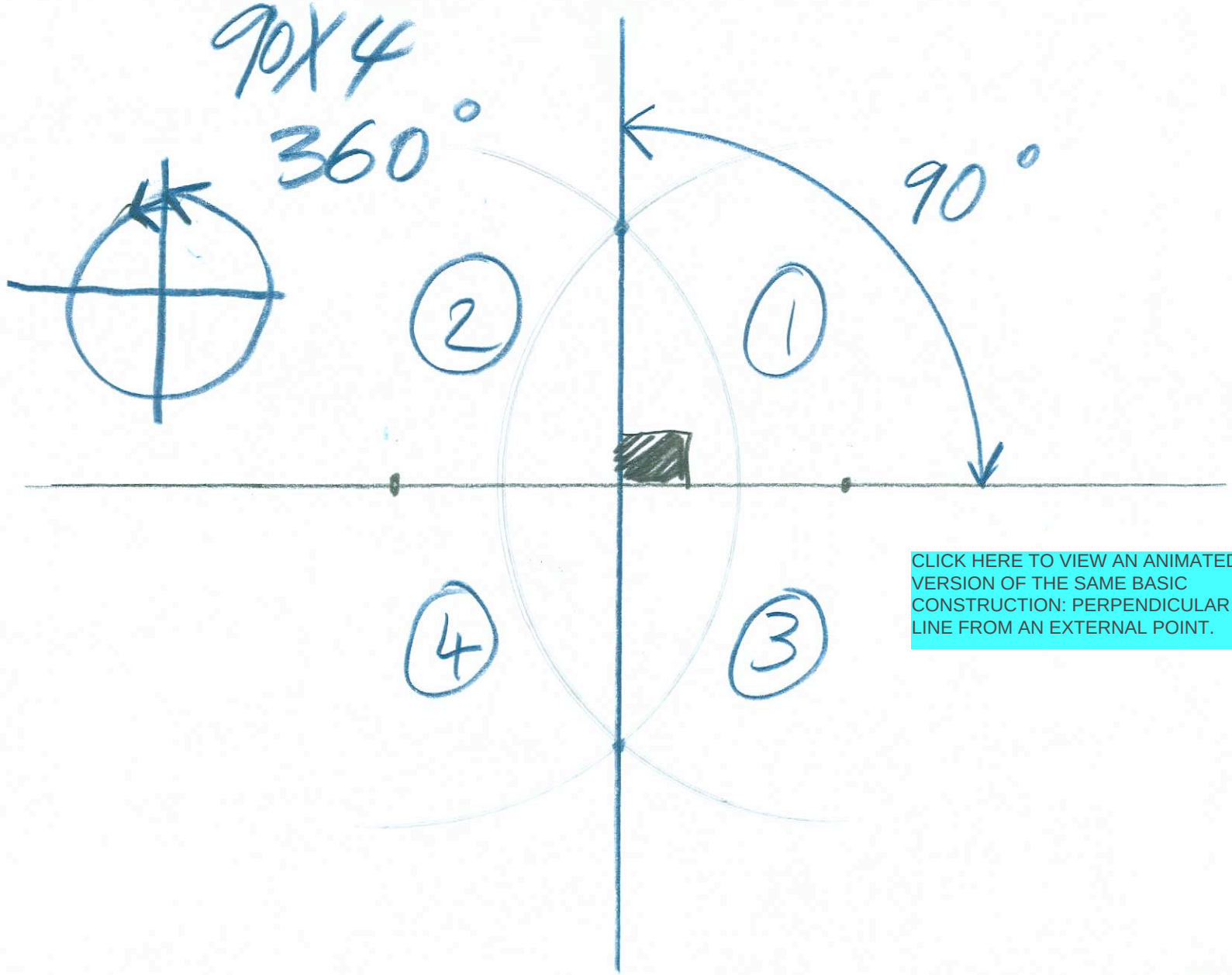

CLICK HERE TO VIEW AN ANIMATED VERSION OF THE SAME BASIC CONSTRUCTION: PERPENDICULAR TO A LINE FROM AN EXTERNAL POINT.

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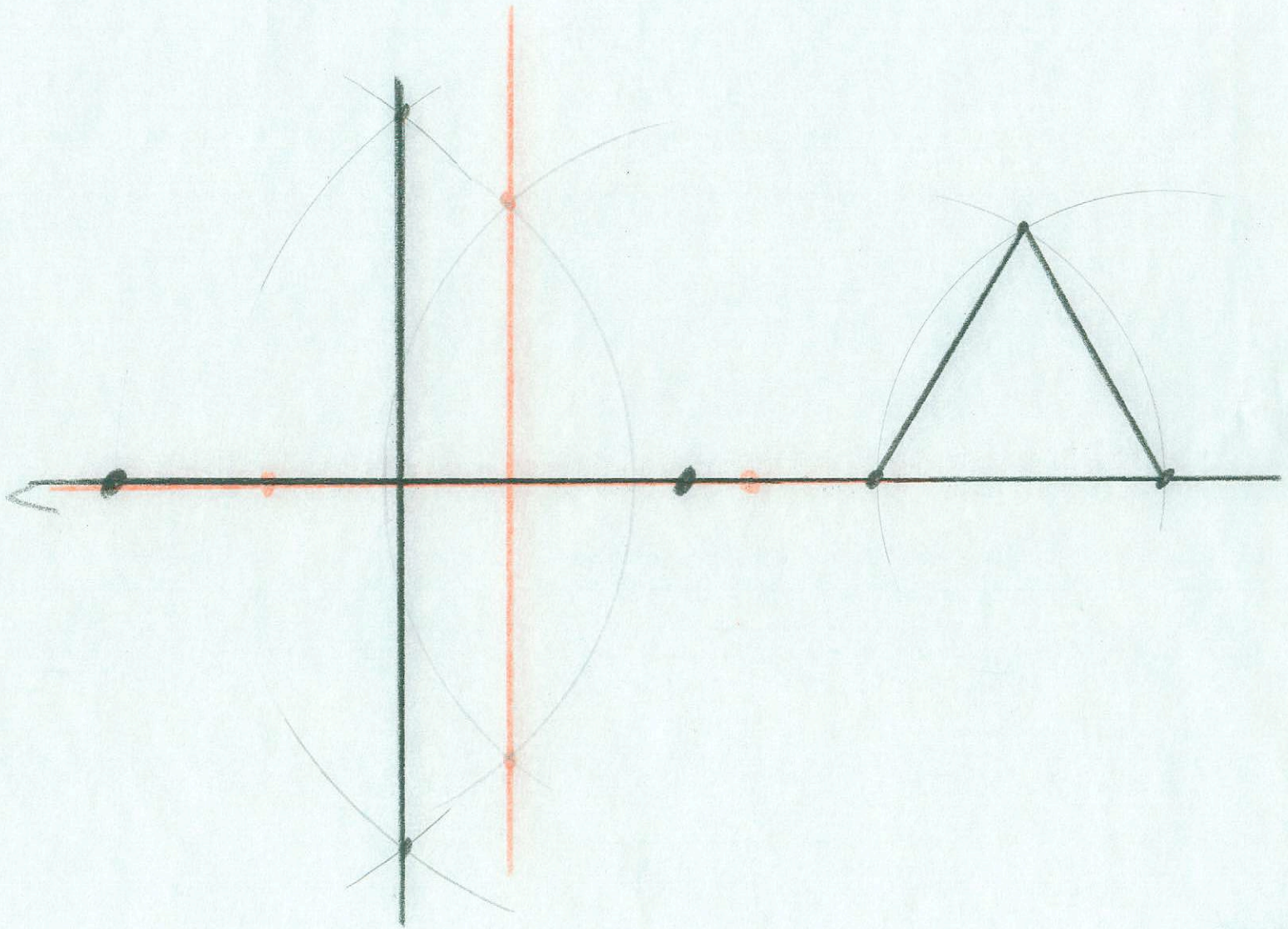

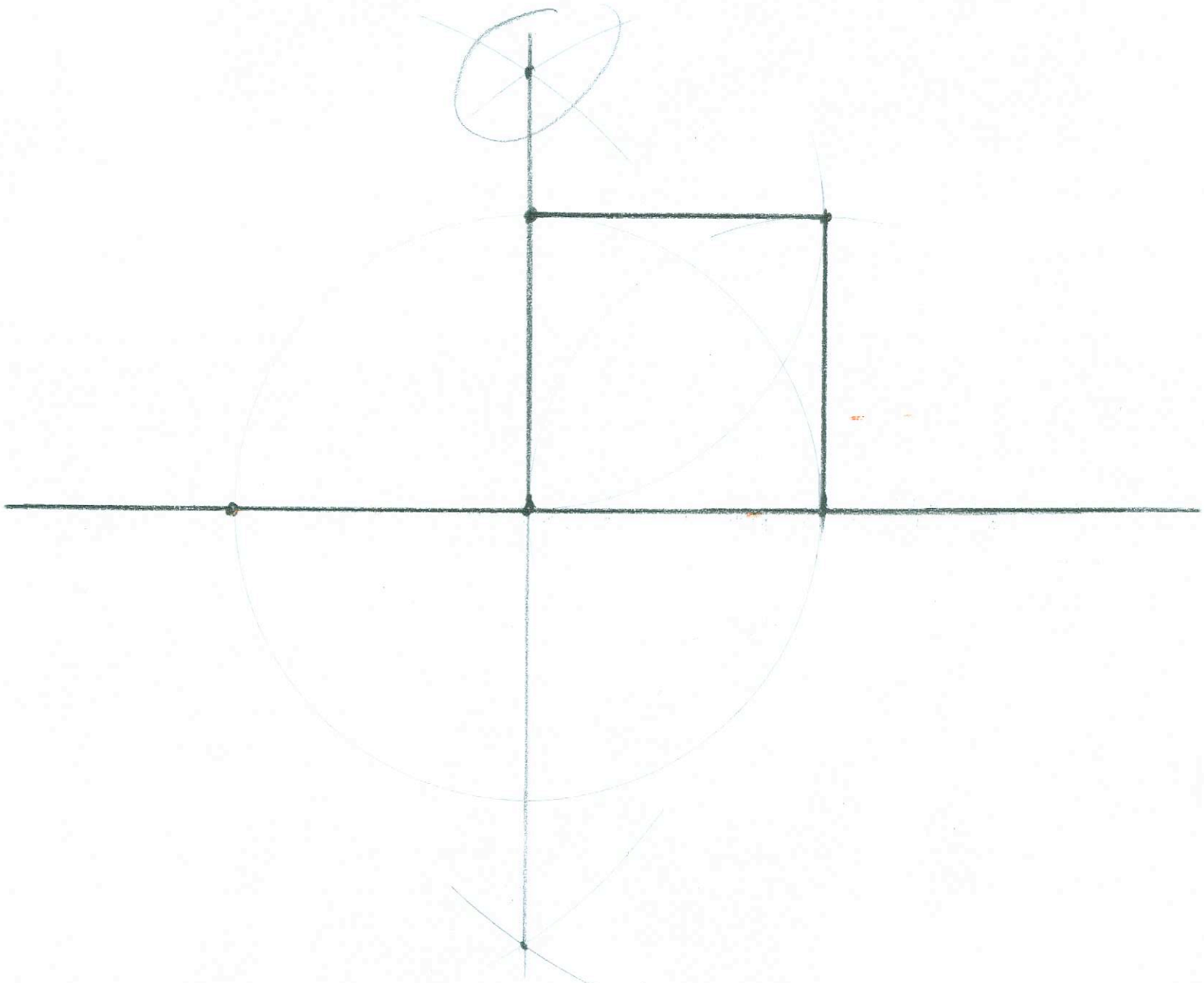

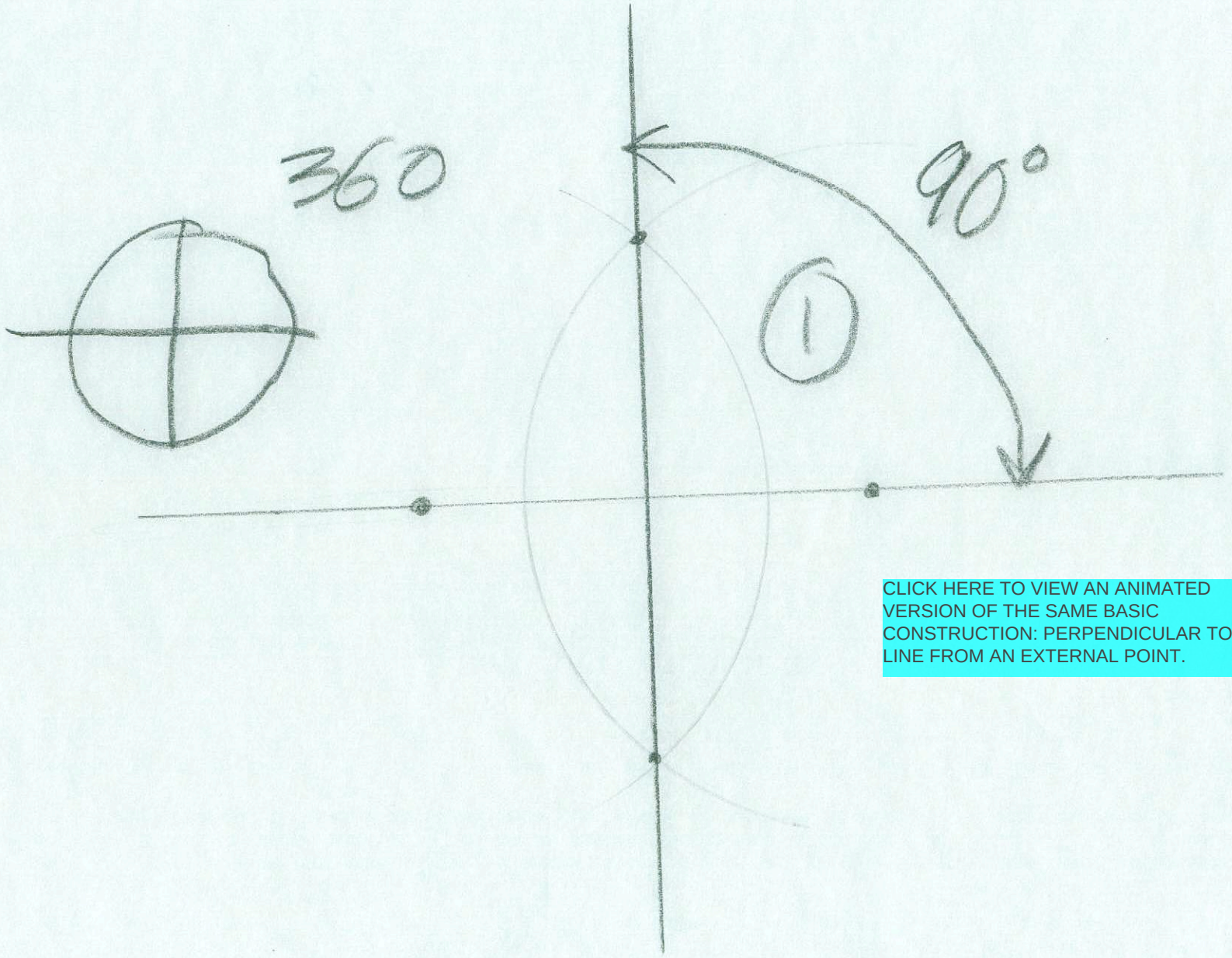

CLICK HERE TO VIEW AN ANIMATED VERSION OF THE SAME BASIC CONSTRUCTION: PERPENDICULAR TO A LINE FROM AN EXTERNAL POINT.

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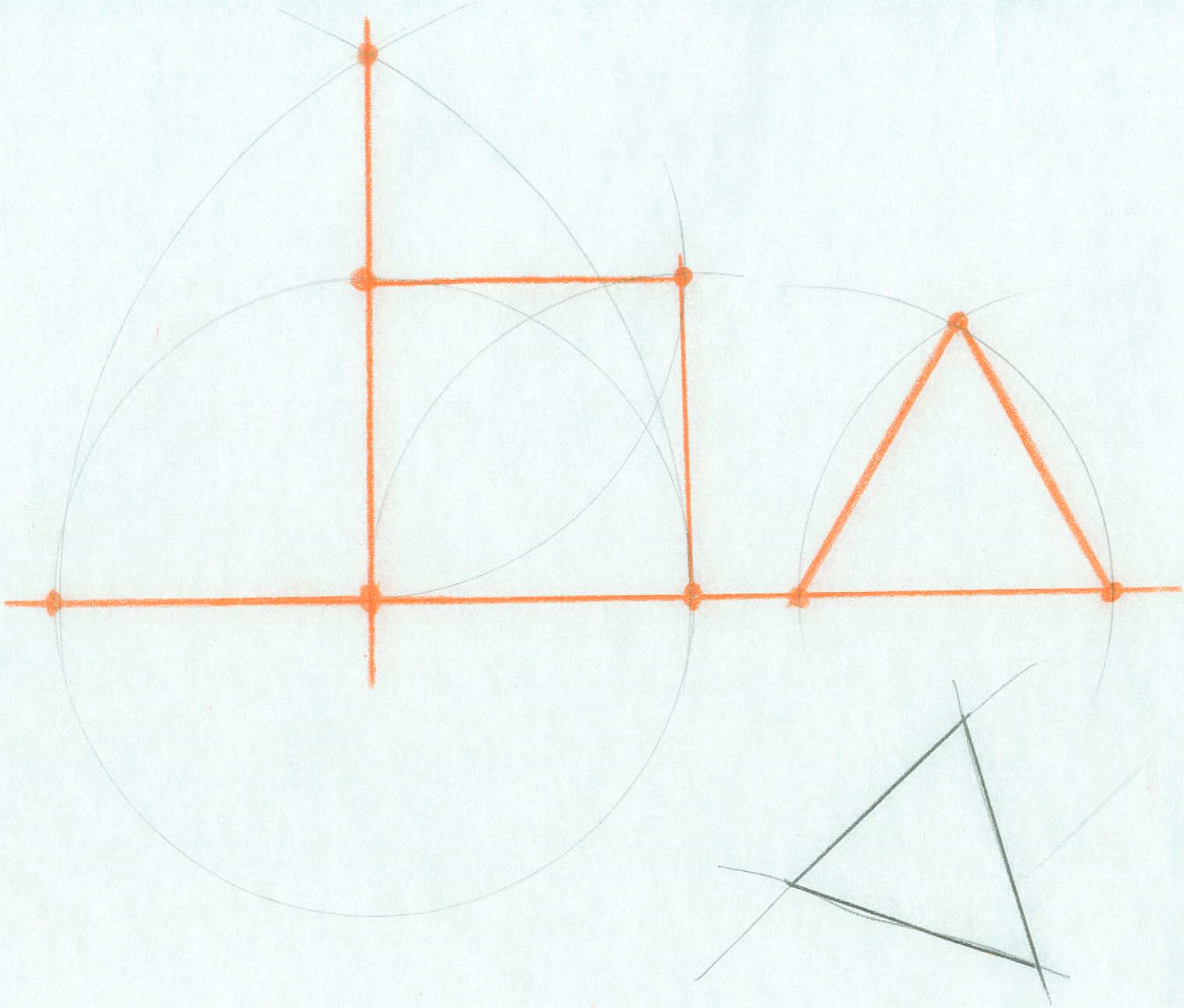

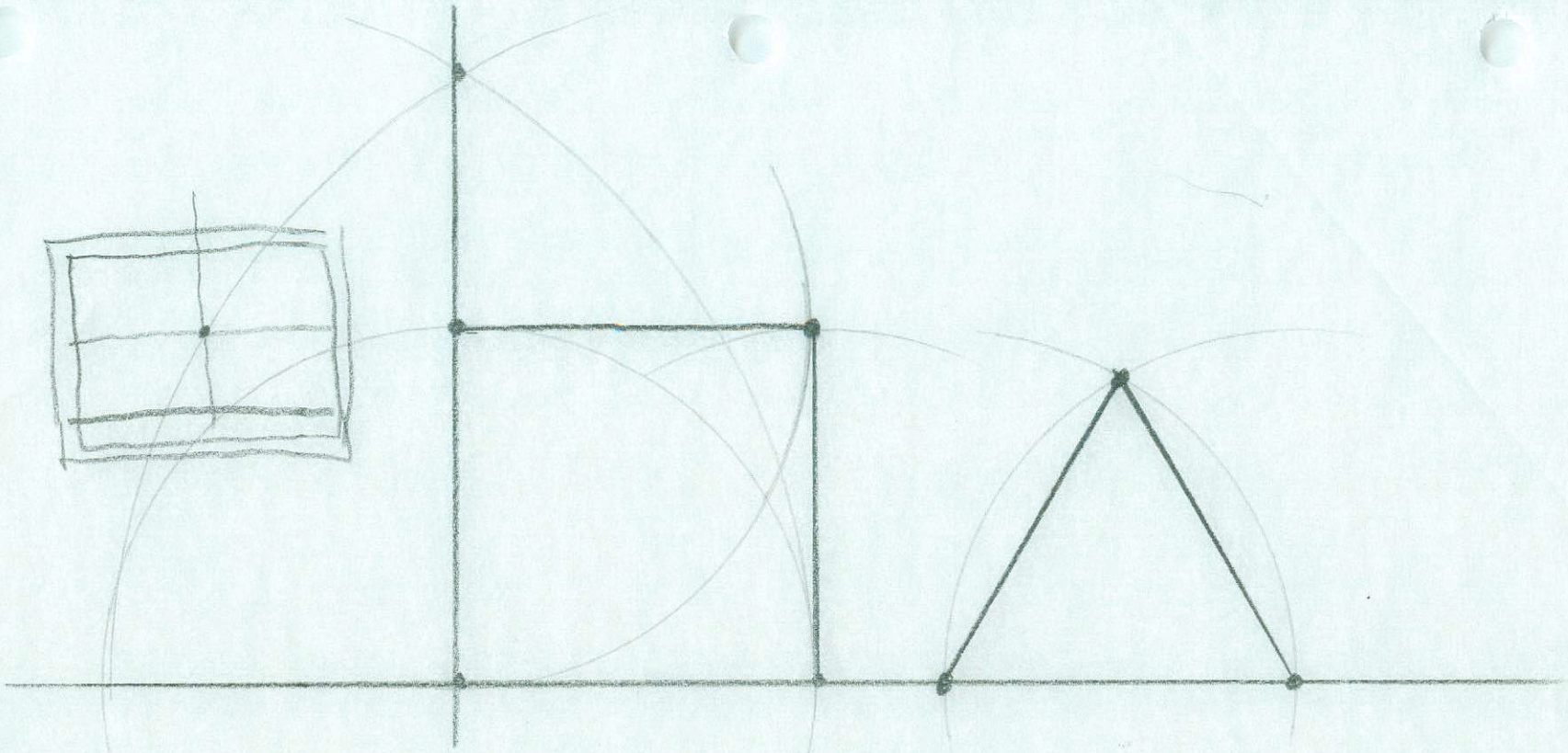

CLICK HERE TO VIEW AN ANIMATED VERSION OF THE CONSTRUCTION: SQUARE GIVEN THE SIDE.

CLICK HERE TO SEE AN ANIMATED VERSION OF THE CONSTRUCTION: EQUILATERAL TRIANGLE GIVEN THE SIDE.

ASSIGNMENT 19: SQUARE. DRAW THE SQUARE WITH A BASE OF 4 INCHES.

ASSIGNMENT 18: TRIANGLE. DRAW THE TRIANGLE WITH A BASE OF 5 INCHES.

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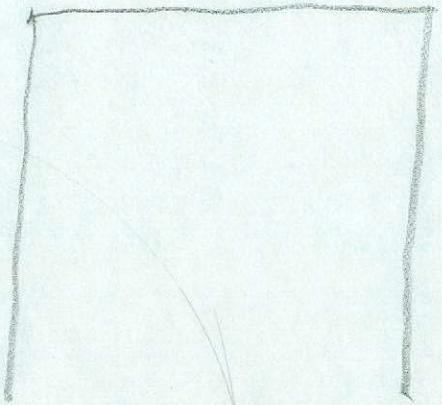

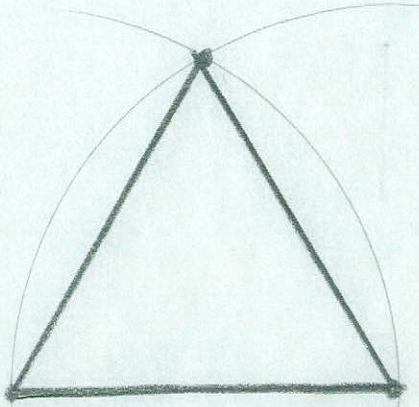

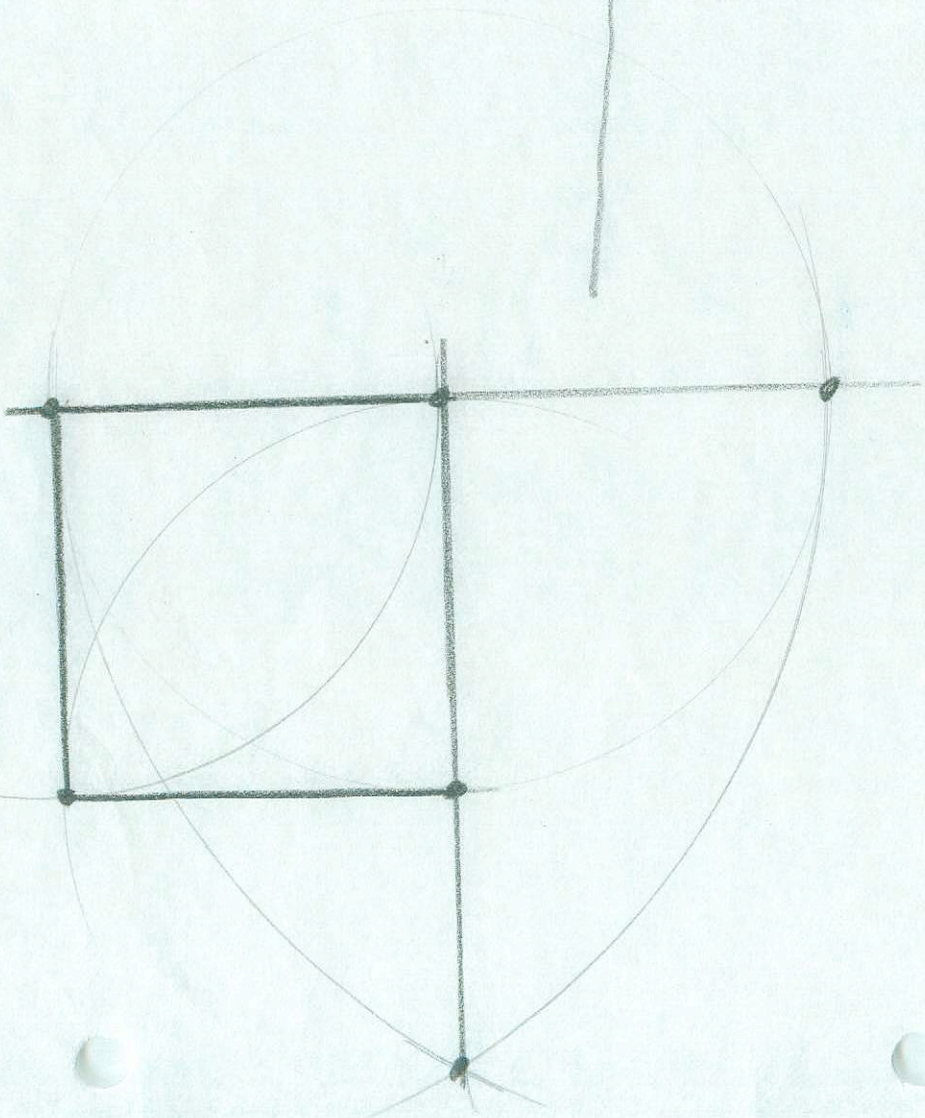

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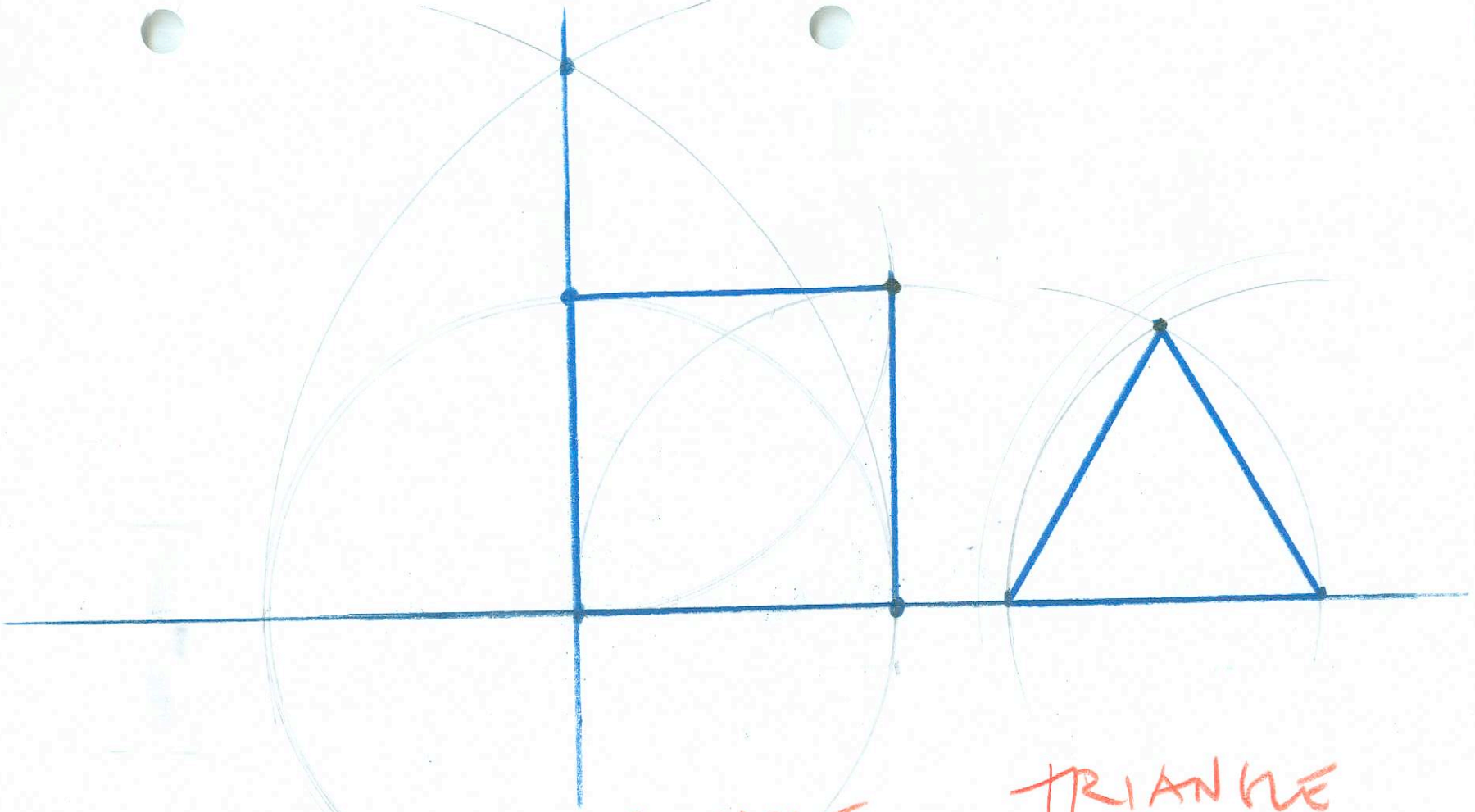

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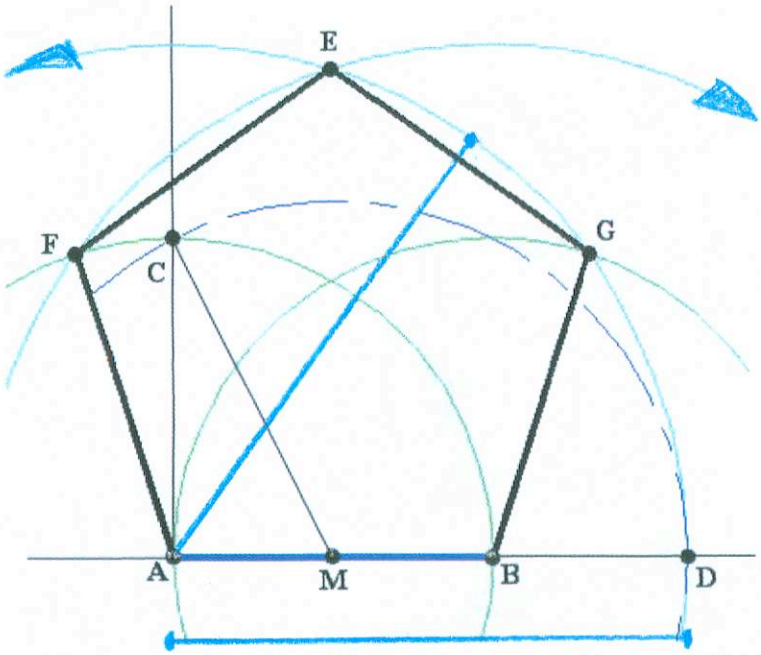
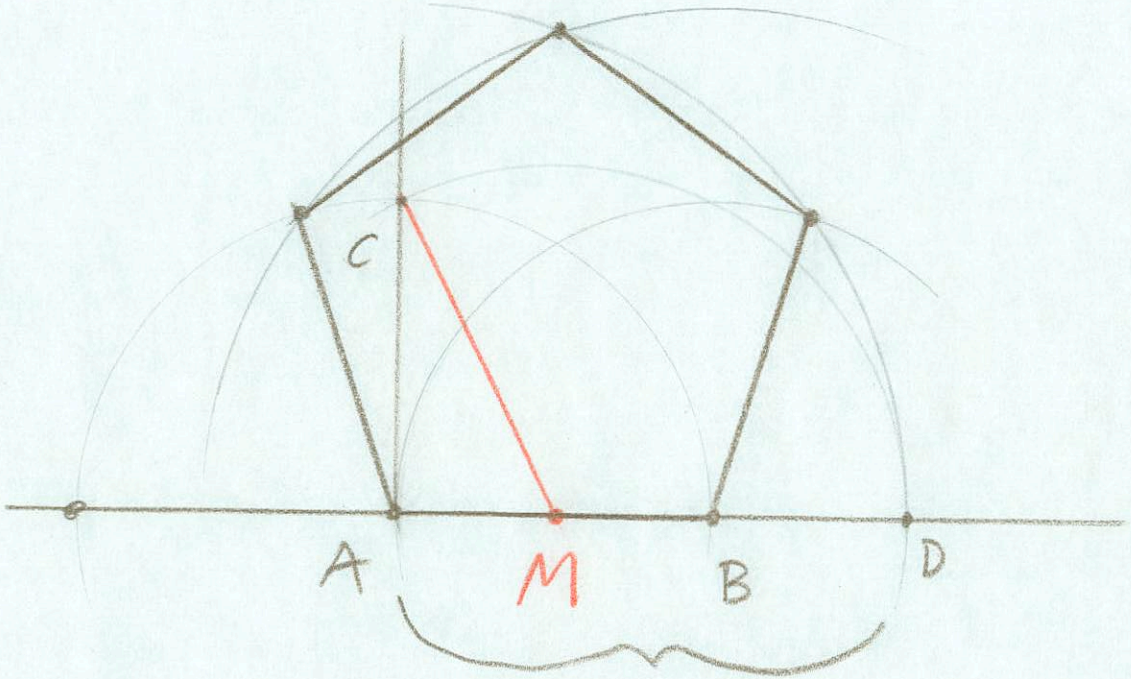


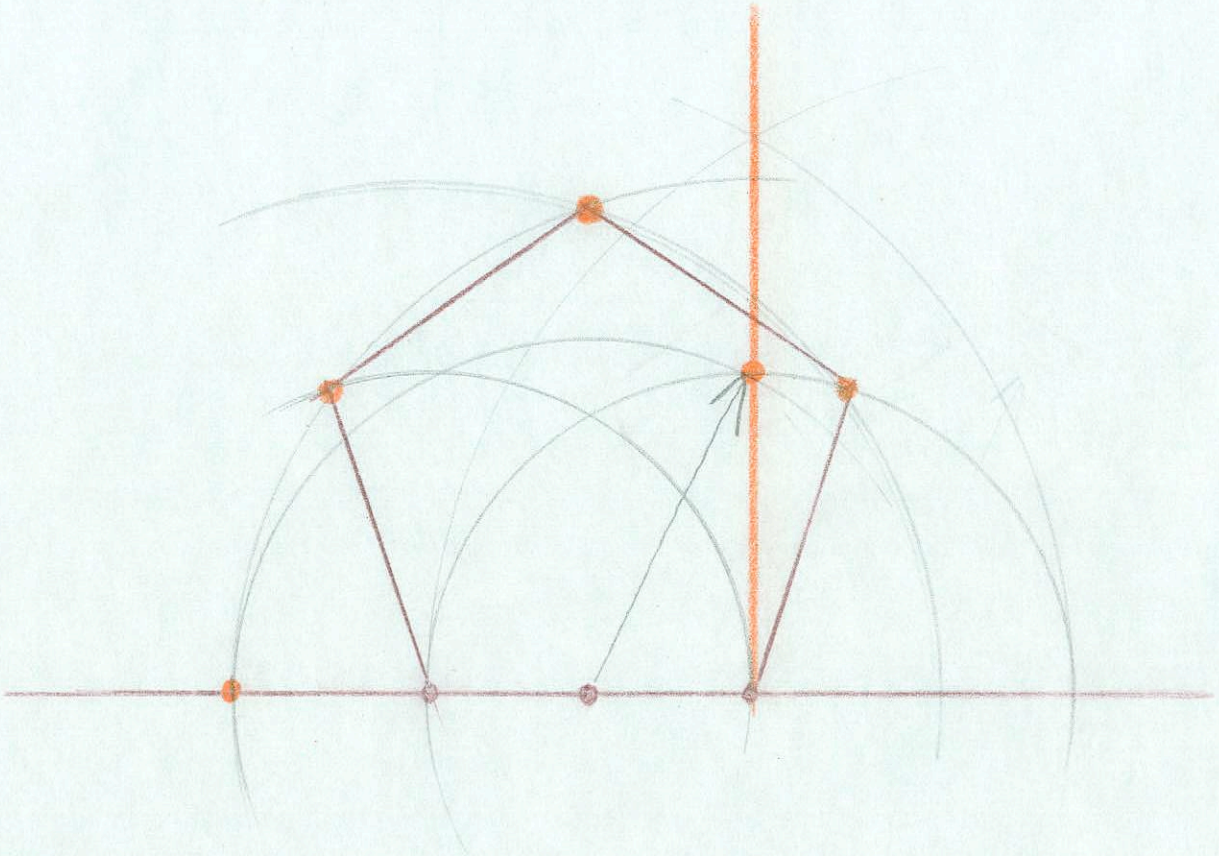
CLICK HERE TO SEE ALTERNATIVE CONSTRUCTION: PENTAGON GIVEN THE CIRCLE.

ASSIGNMENT 20: PENTAGON. DRAW THE PENTAGON WITH A BASE OF 2.5 INCHES.

Constructing a pentagon given one side.

1. Draw a horizontal line 1" above the tittle block (see layout handout).
2. Given side *AB* (2.5 inches), find *M*, the midpoint of *AB*.
3. Draw a perpendicular line through *A* – see separate demo for drawing a line perpendicular to a point on a horizontal line.
4. Draw a circle with center in *A* and radius *AB*. This circle intersects the perpendicular line at *C*.
5. With compass, center in *M* and draw a circle with radius *MC*. This circle intersects horizontal base line at point *D*.
6. Draw a circle with center in *A* and radius *AD*. Also with radius *AD*, draw a circle with center in *B*.
7. These two circles intersect at *E*.
8. Draw a circle with center in *B* with radius *AB*. It intersects the larger circle at point *G*.
9. With same radius *AB*, draw another circle with center in *A*. This circle intersects the other large circle at point *F*.
10. *ABGEF* are points of a regular pentagon.


C
A
M
B
D



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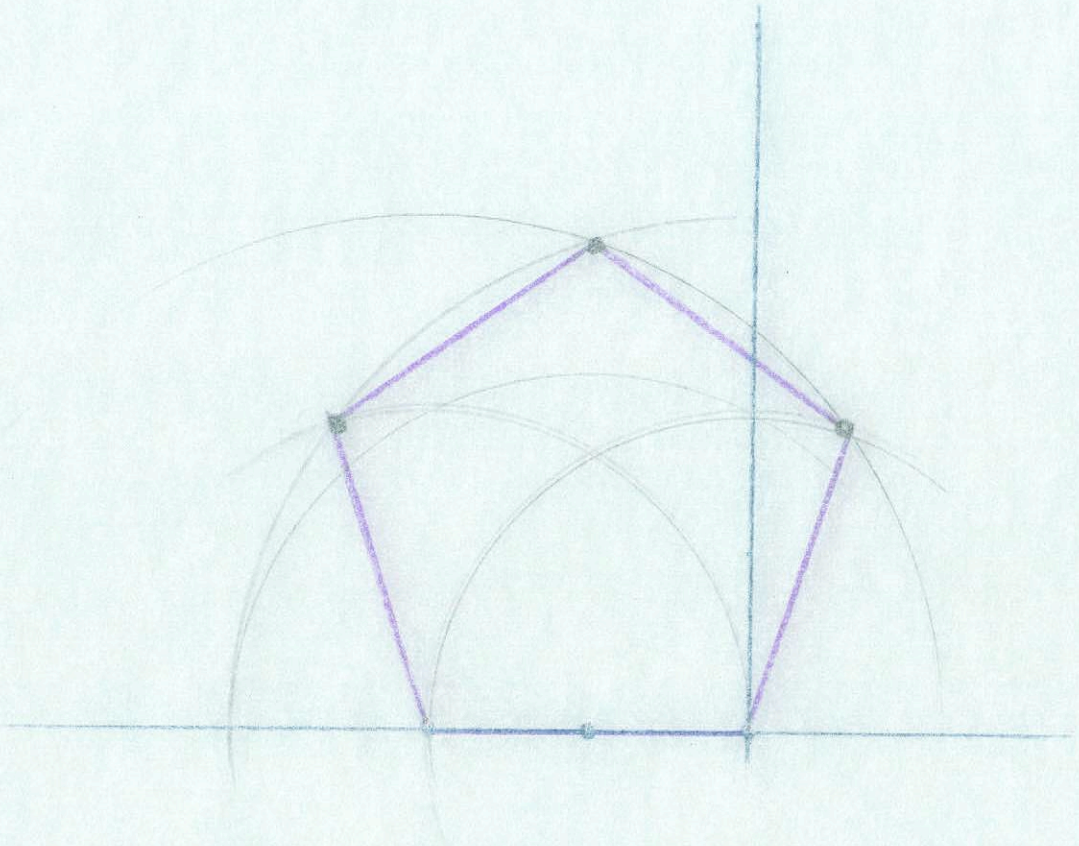

PENTAGON

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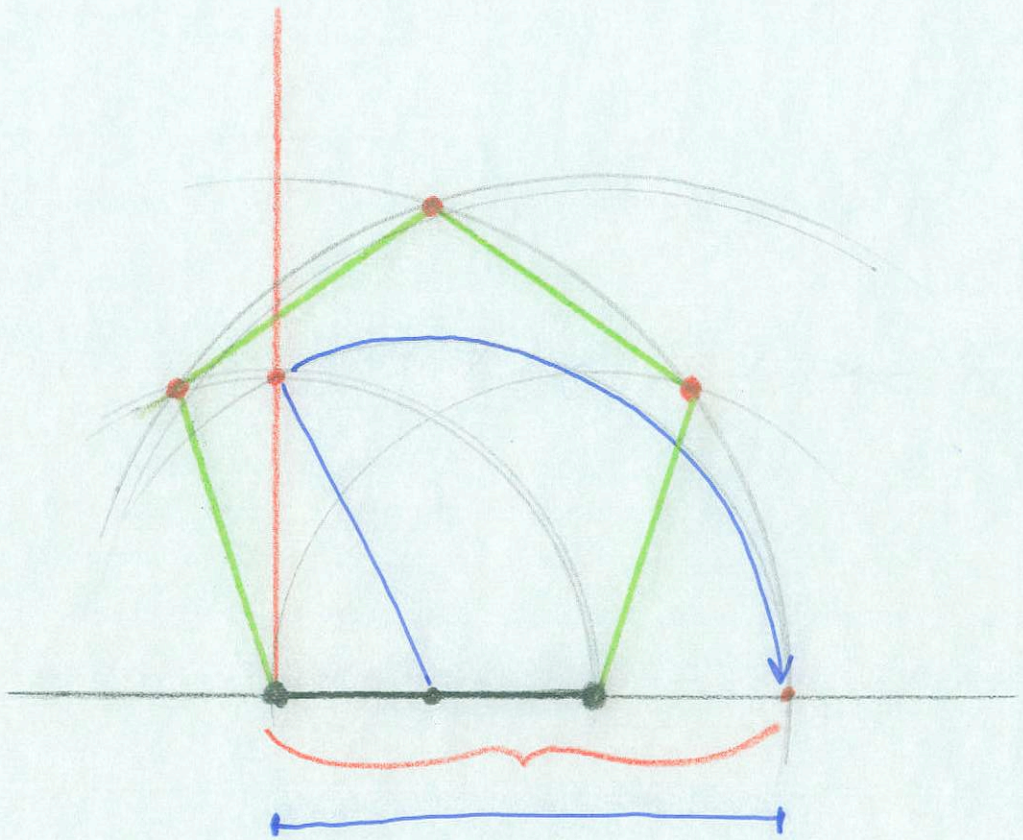

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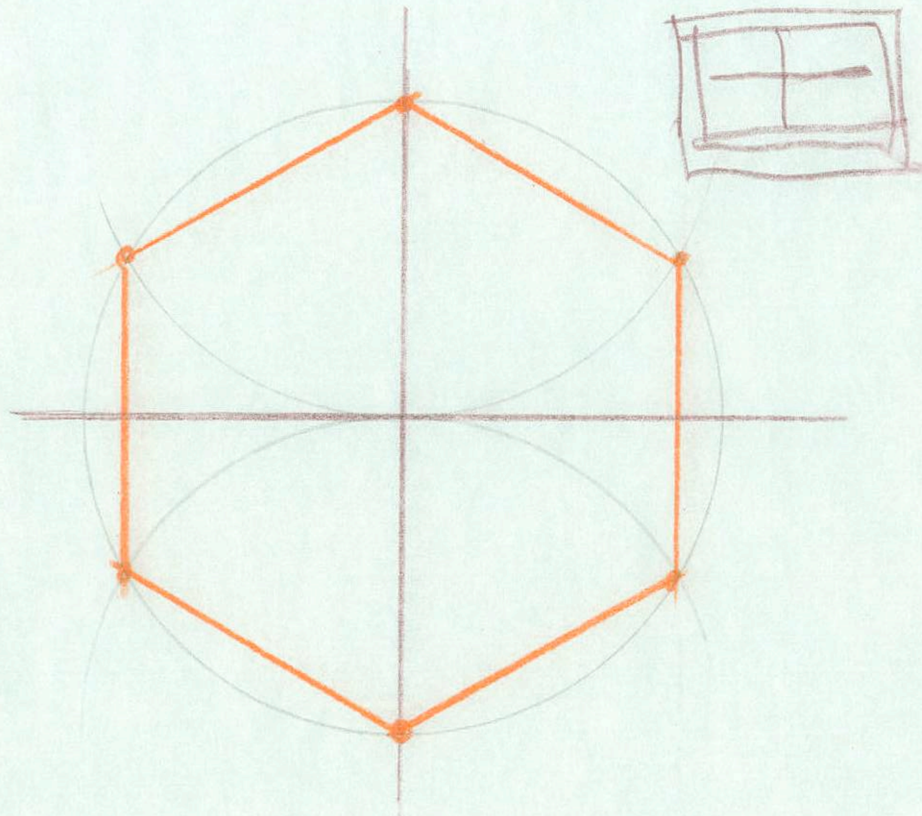
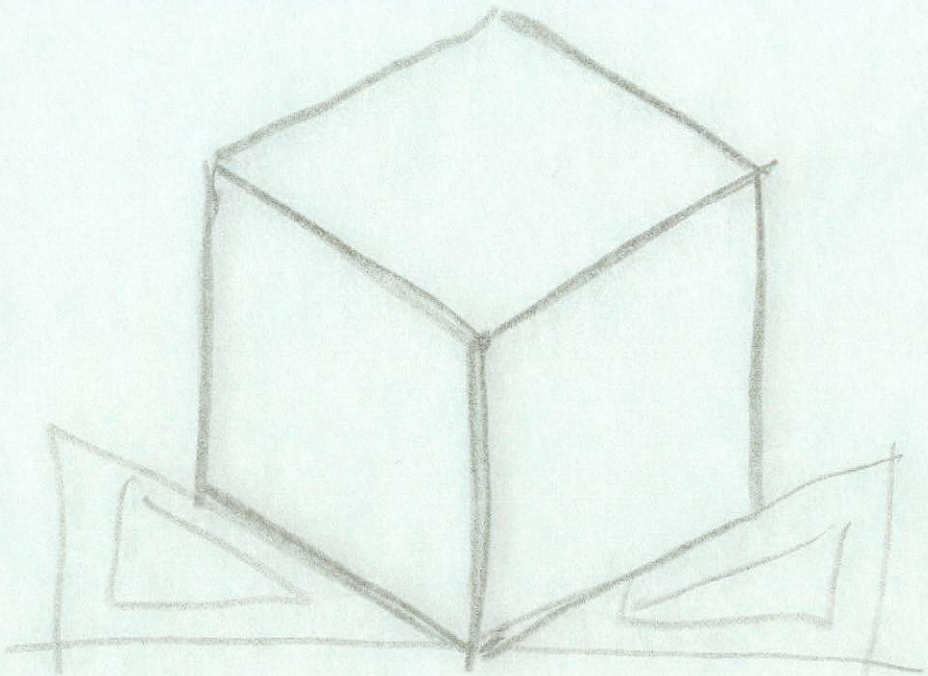
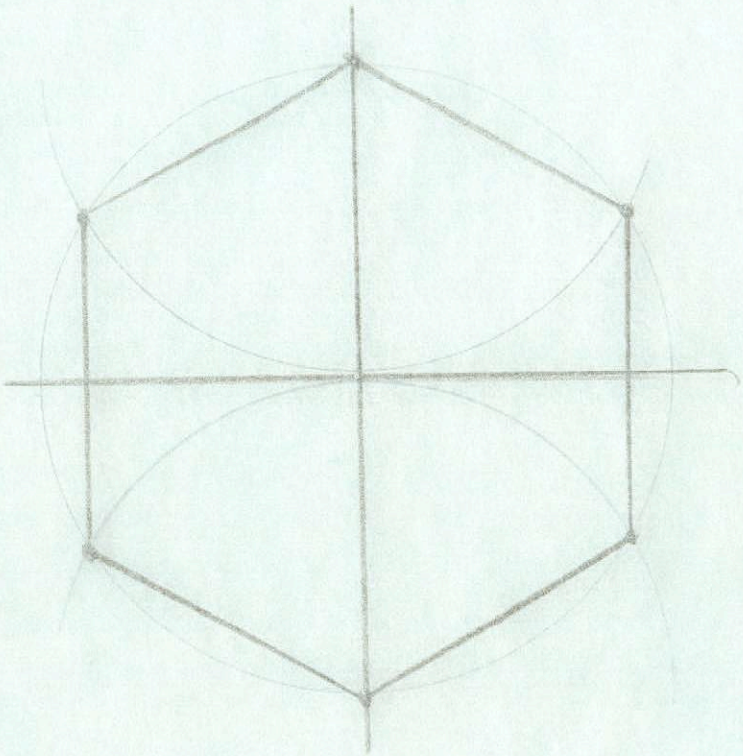
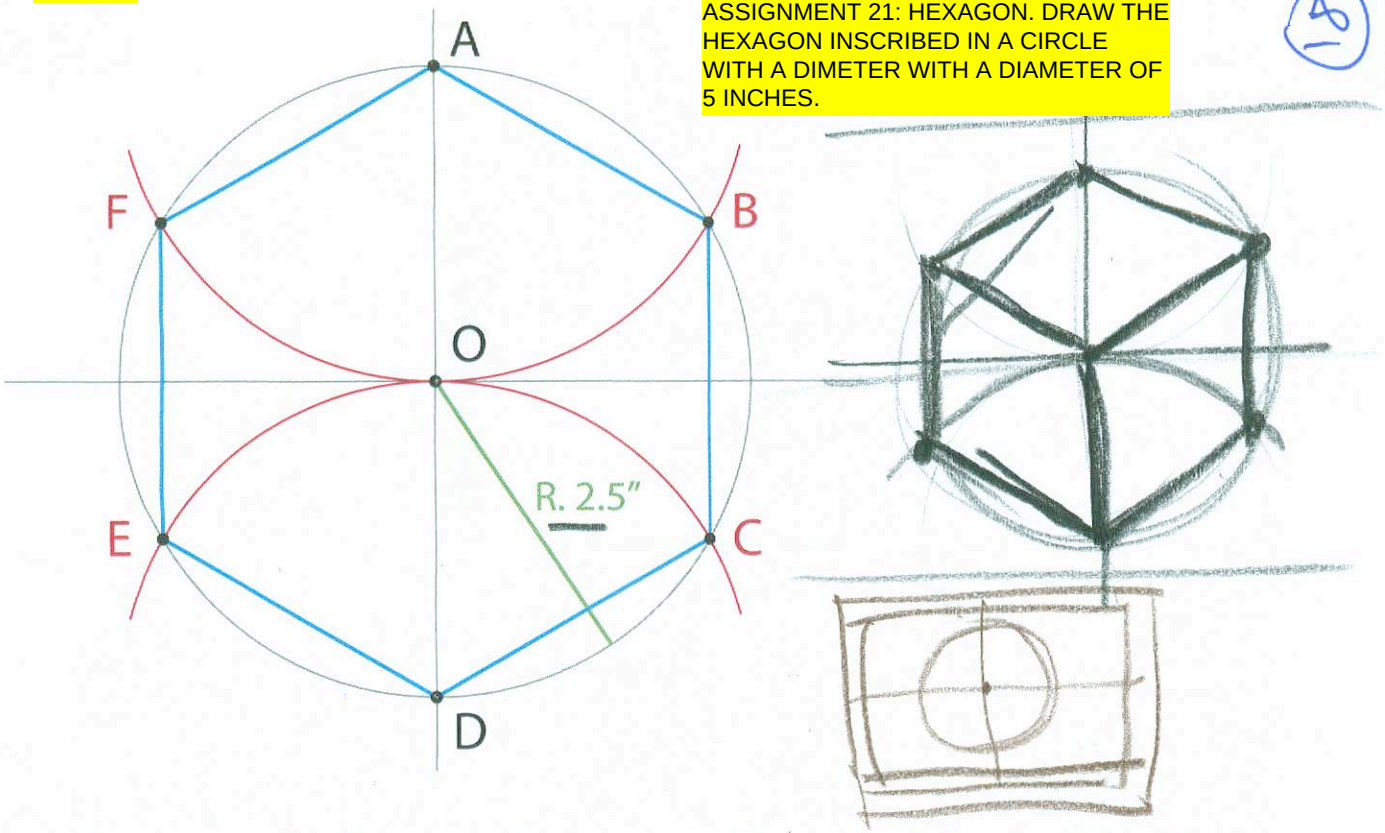






ASSIGNMENT 21: HEXAGON. DRAW THE HEXAGON INSCRIBED IN A CIRCLE WITH A DIMETER WITH A DIAMETER OF 5 INCHES.



Construction of the hexagon, given two center lines and a circle of any diameter.

For a polygon with six sides (hexagon) inscribed inside a known circle:

1. Find center of drawing area and draw long vertical and horizontal lines which are perpendicular to each other. (See page 2 for general layout specifications).
2. Draw a circle with radius (R) equal to 2.5", with center in O (the intersection between the vertical and horizontal lines).
3. Draw two arcs (red) with radius 2.5" and center in points A & D, that intersect the circle at points B & C and E & F.
4. Now draw straight lines (blue) from A to B, B to C, C to D, D to E, E to F and F to A to complete the hexagon. (Do not draw the dark dots, shown for clarity only)

Partial source: website of
Stevenson High School, Illinois

HEXAGON

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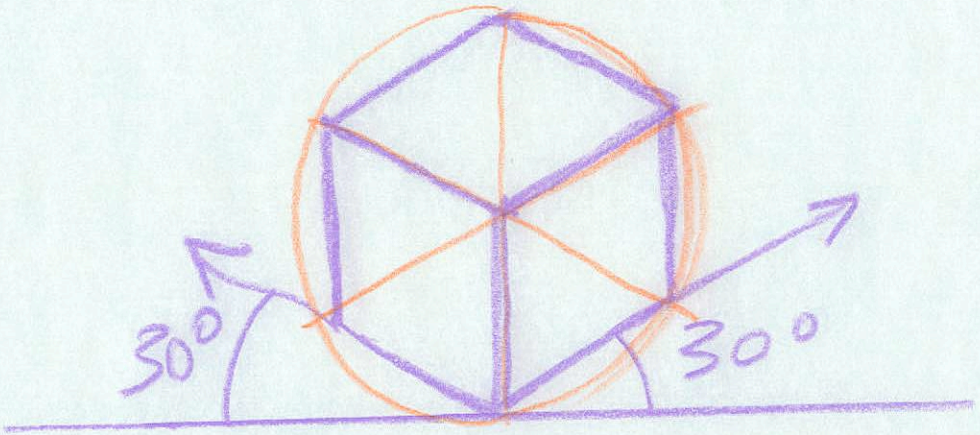

ISOMETRIC

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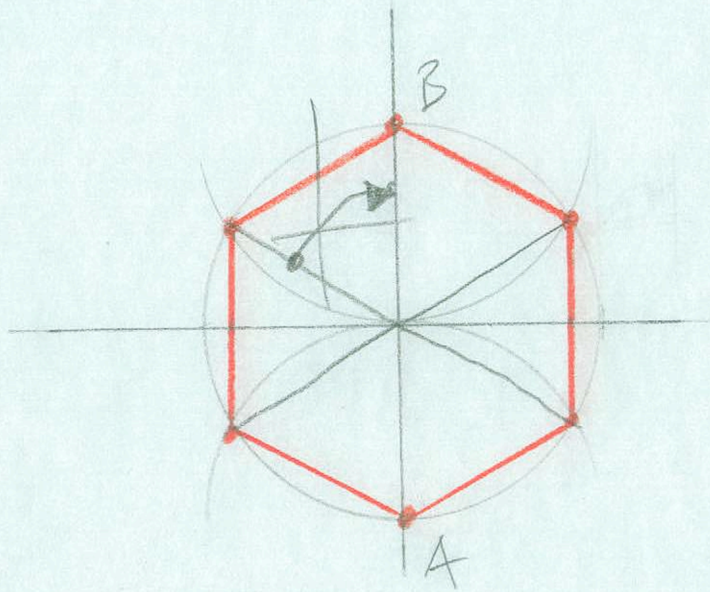
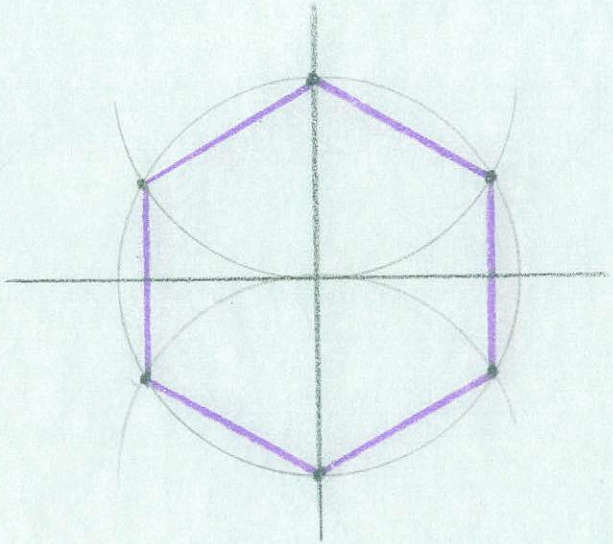
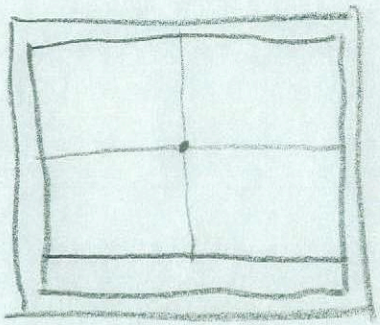

B
A





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proof in

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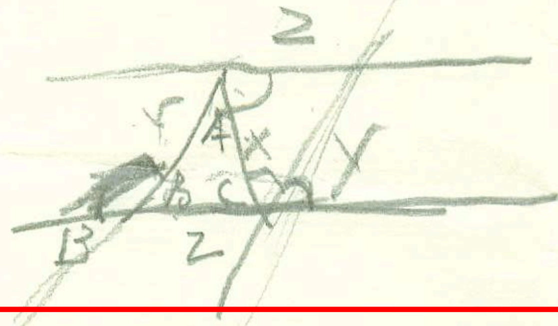
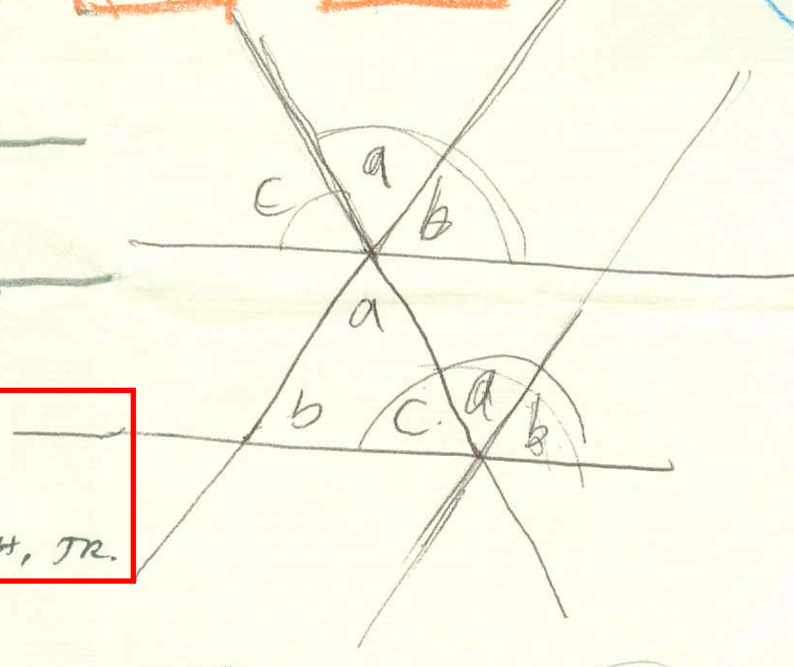
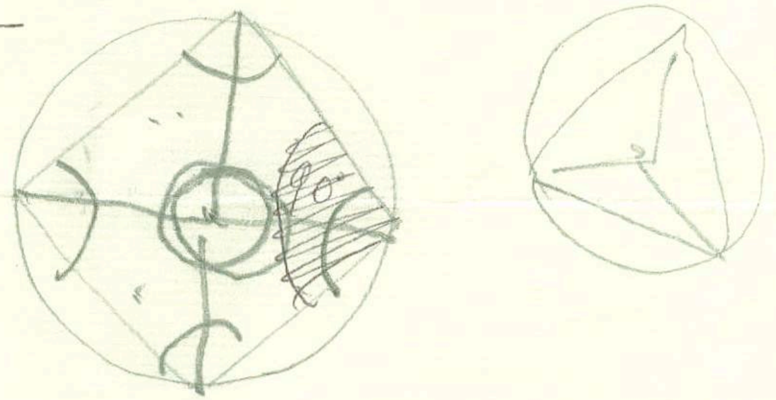




FORMULA FOR THE SUM OF THE INTERNAL ANGLES OF A POLYGON. E.D. HIRSCH, JR.

internal 2007(?)



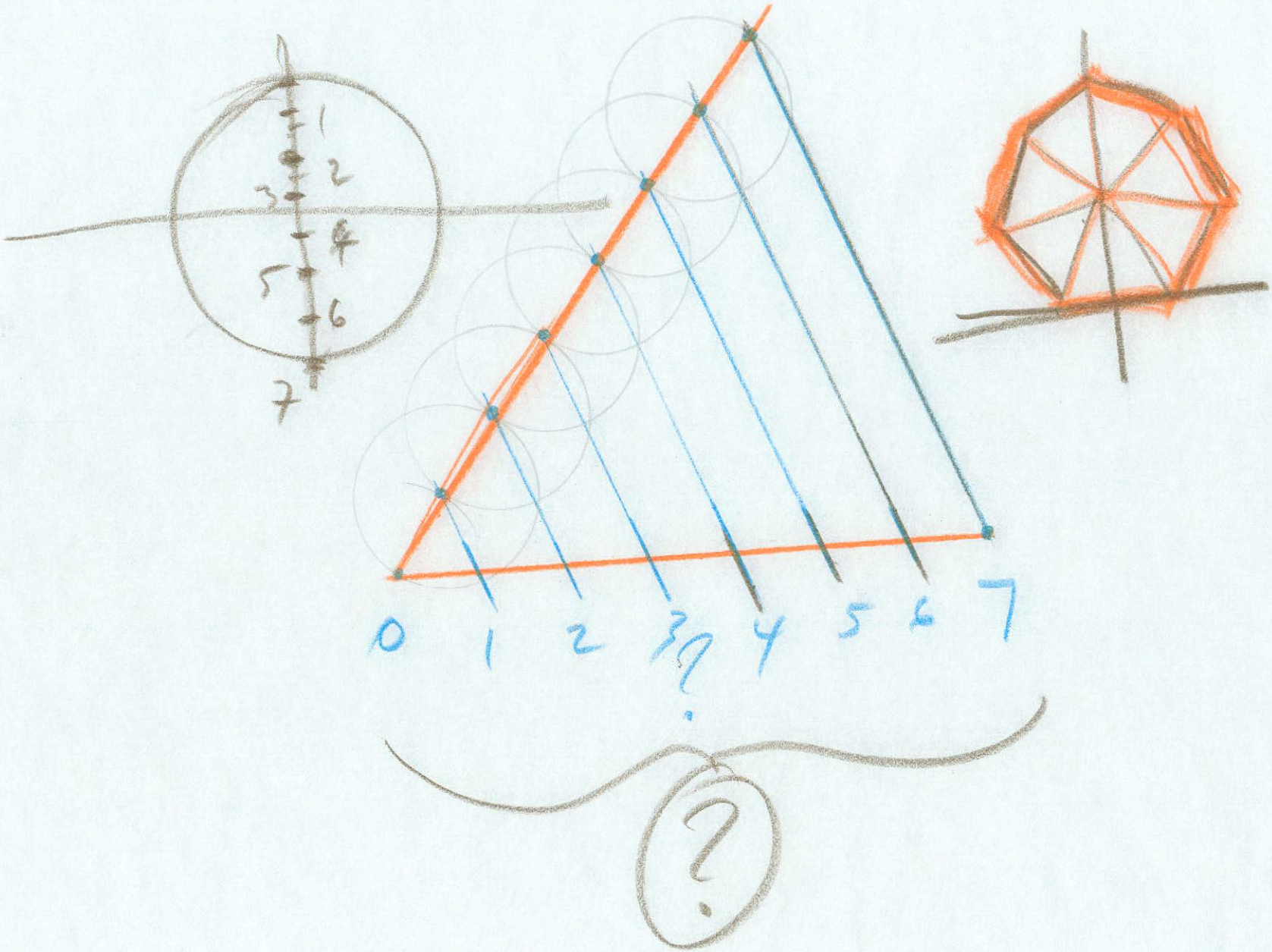
(The sum of angles in a polygon is equal to

$180 \times 4 - 360 = \frac{360}{4} = 90°$

180° (flat angle or the sum of angles in a triangle) X the number of sides of the polygon MINUS ~~180°~~ 360° (rounded angle or sum of angles at the meeting of all triangles formed by connecting the sides of the polygon (bases) to the center of the polygon

(22) ~~19~~

(~~13~~)



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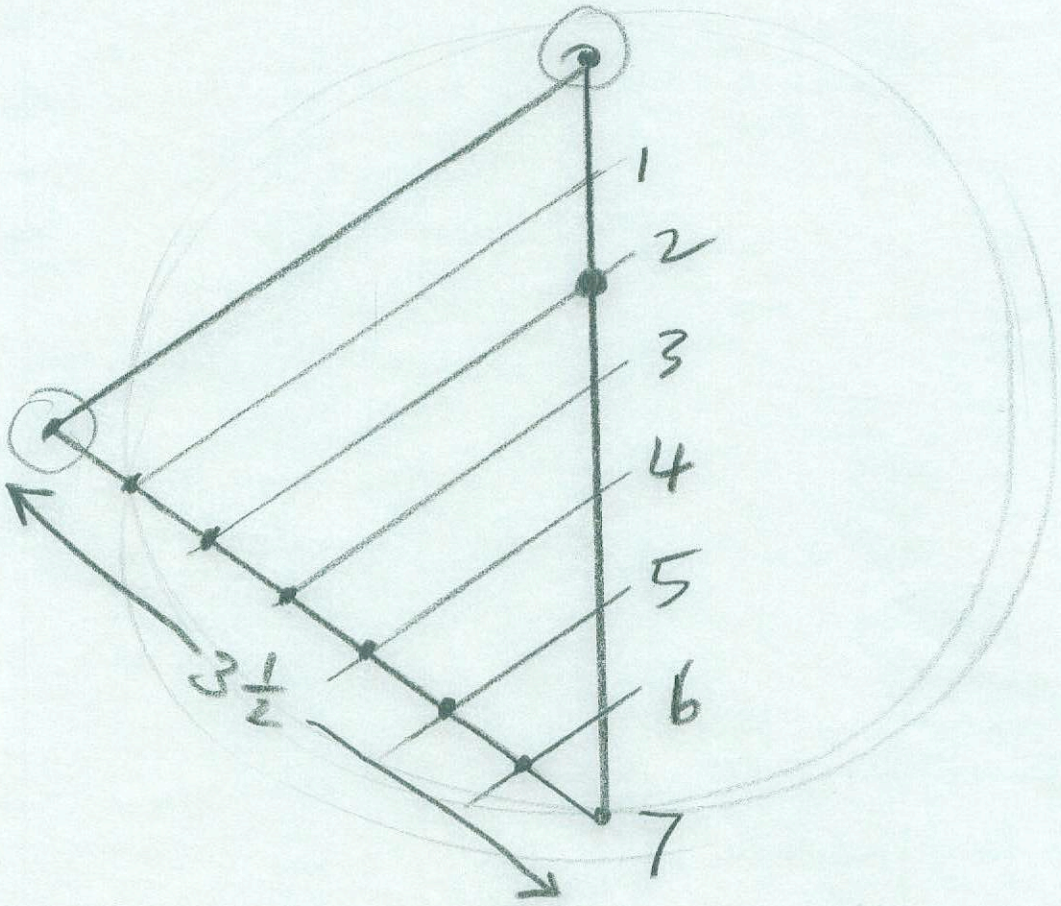
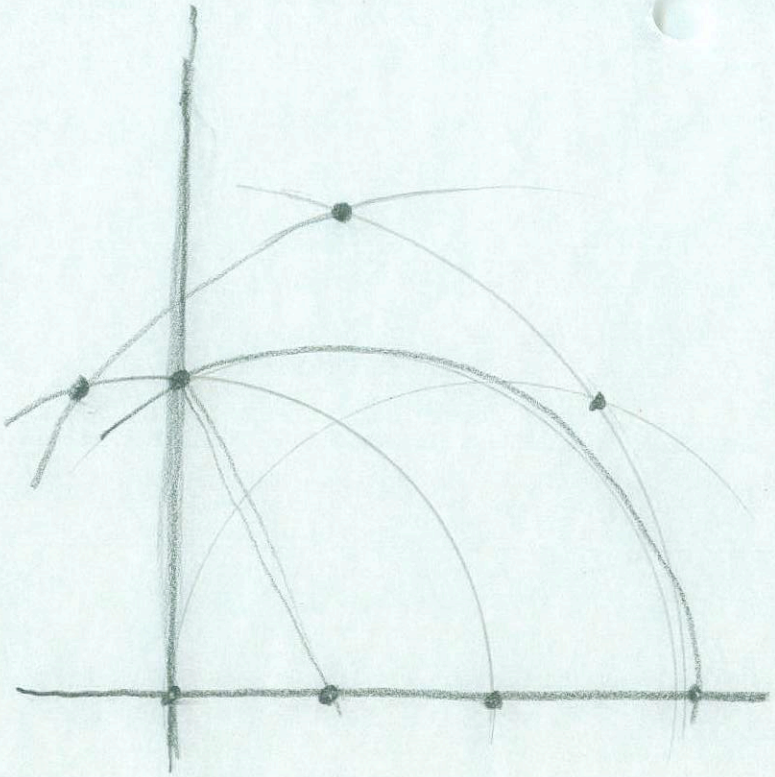
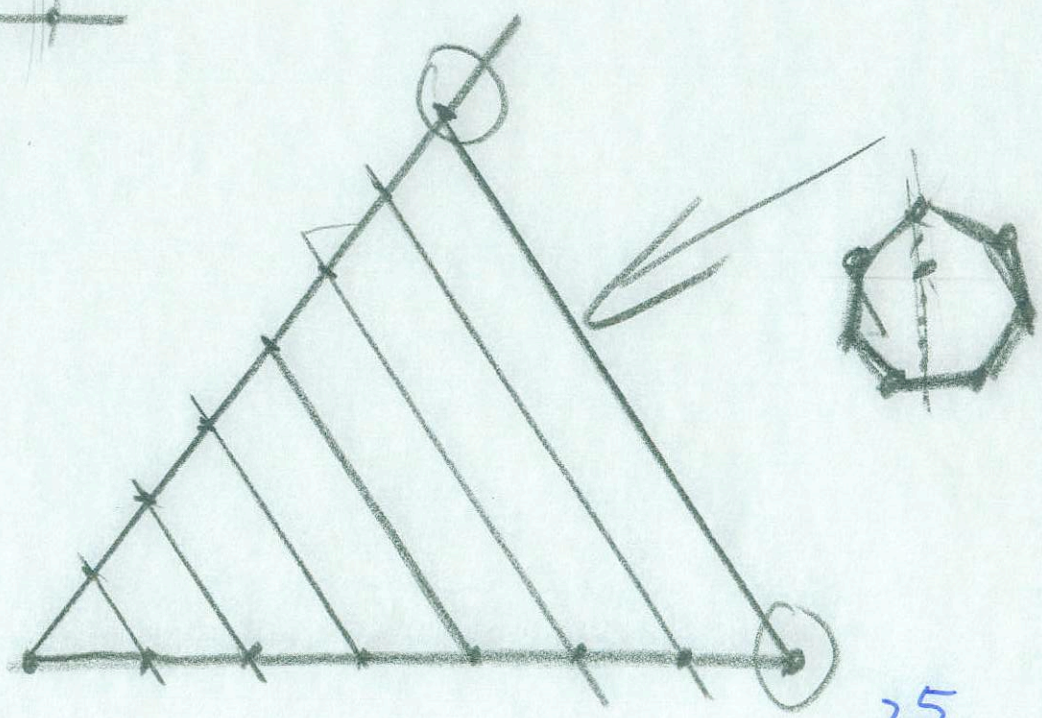


CLCIK HERE FOR A DEMO OF THE EQUAL DIVISION USING ONLY STRAIGHT EDGE AND UNMARKED RULER.

FOR FUN: CLICK HERE TO SEE A DEMO OF EQUAL DIVISIONS USING COMPASS AND UNMARKED STRAIGHT EDGE.

EQUAL DIVISIONS OF A SEGMENT





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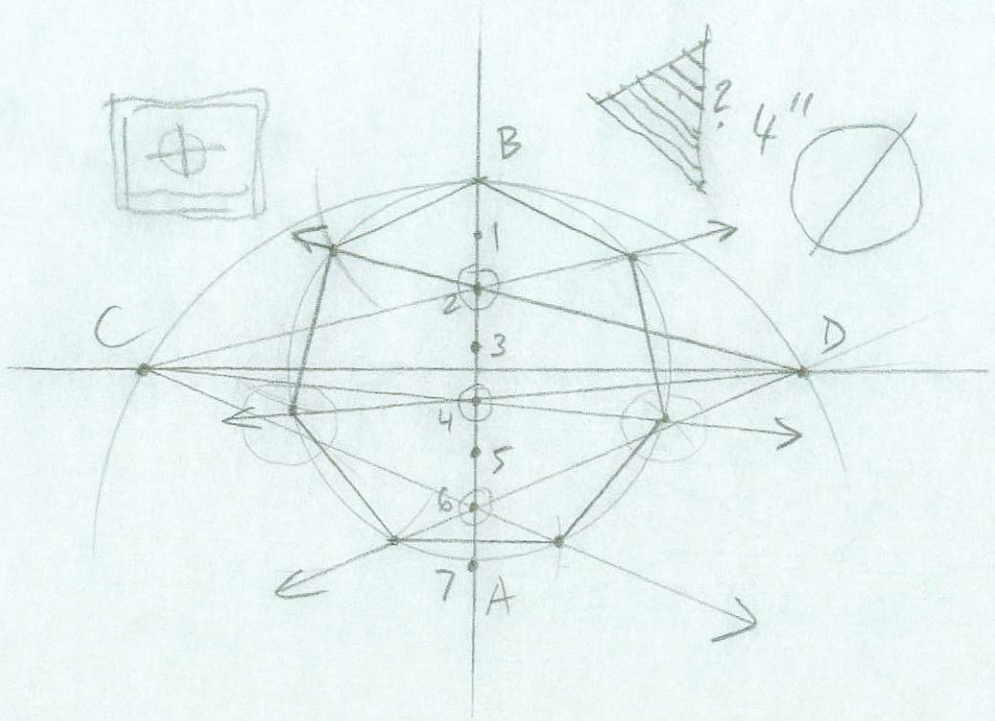
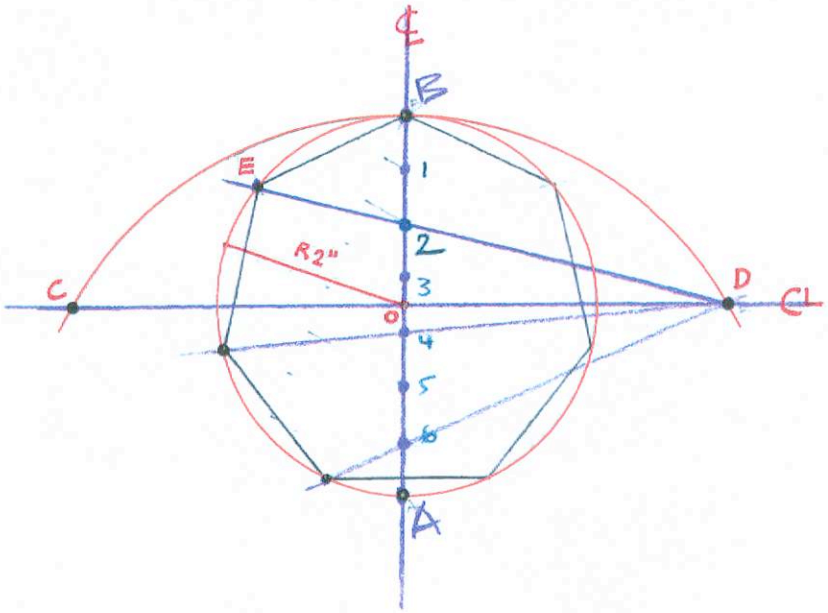

B
1
2
3
C
D
4
5
6
7
A
2. 4"



HEPTAGON
(7)

Dividing a circle into an equal number of segments.
The technique illustrated in the figure above may be used to draw a polygonal structure.

For a polygon with seven sides:

1. Find center of drawing space and draw long vertical and horizontal lines which are perpendicular to each other. (See page 3 for general layout specs).

2. Draw a circle with radius equal to 2", with center in *O*.

3. Divide the diameter *AB* into seven equal parts – the number of required sides, using the technique described on page 2 for the division of a segment into an equal number of parts.

4. Prolong the horizontal line passing in *O* almost to the width of the drawing space.

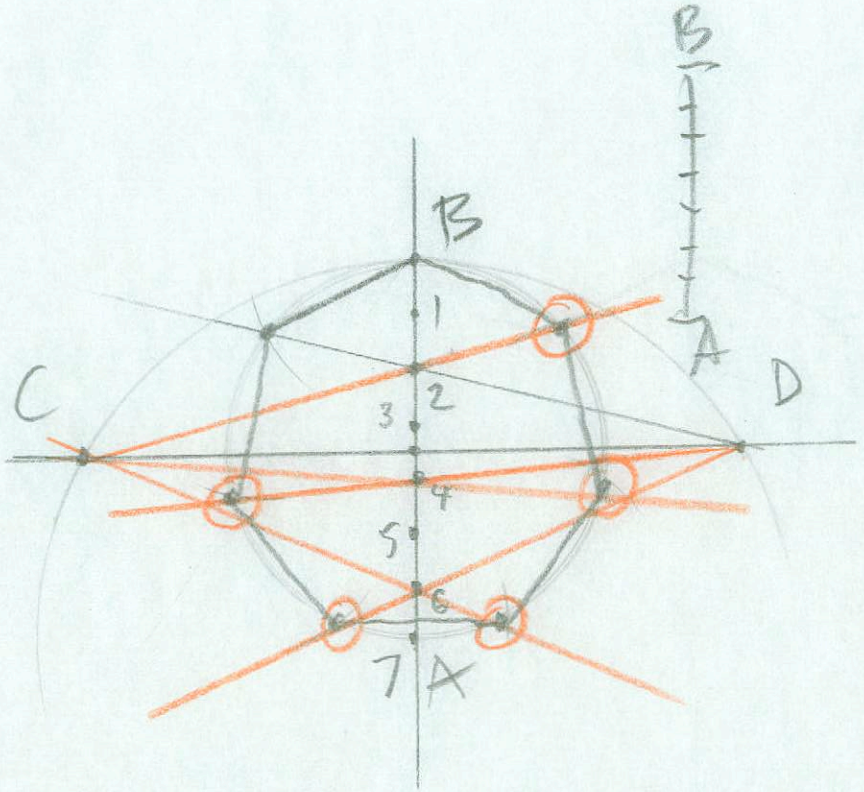
5. With *A* as a center, and *AB* as a radius, describe an arc to intersect the circle in *B* and the horizontal line in *C* and *D*.

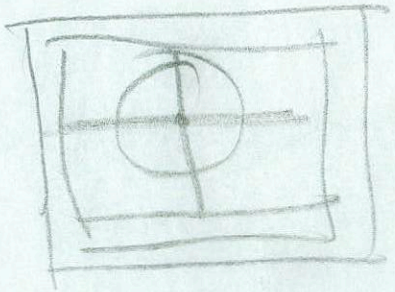
6. Connect *D* and *2*, the second division inside *AB*, prolong the line *D2* cutting the circumference at *E*.

7. Draw the chord *EB*, it is one side of the required polygon: the seven-sided heptagon.

8. With the compass set to the length of *EB*, step off the remainder of the polygon on the circumference to find all other sides.

9. An alternate way is to connect *C* and *D* to divisions number *2*, *4*, and *6*, and prolonging those lines until they intersect the circle.





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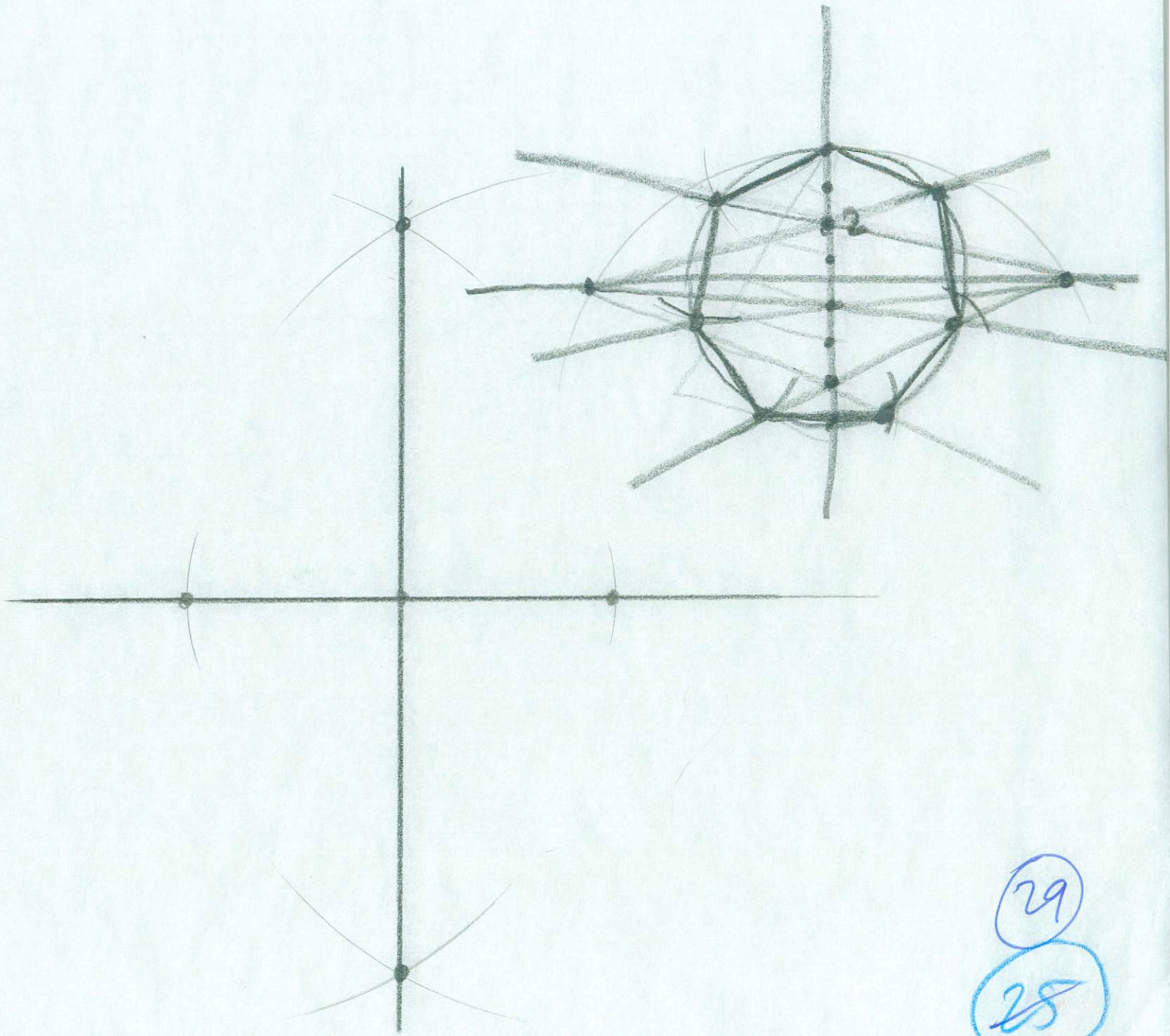

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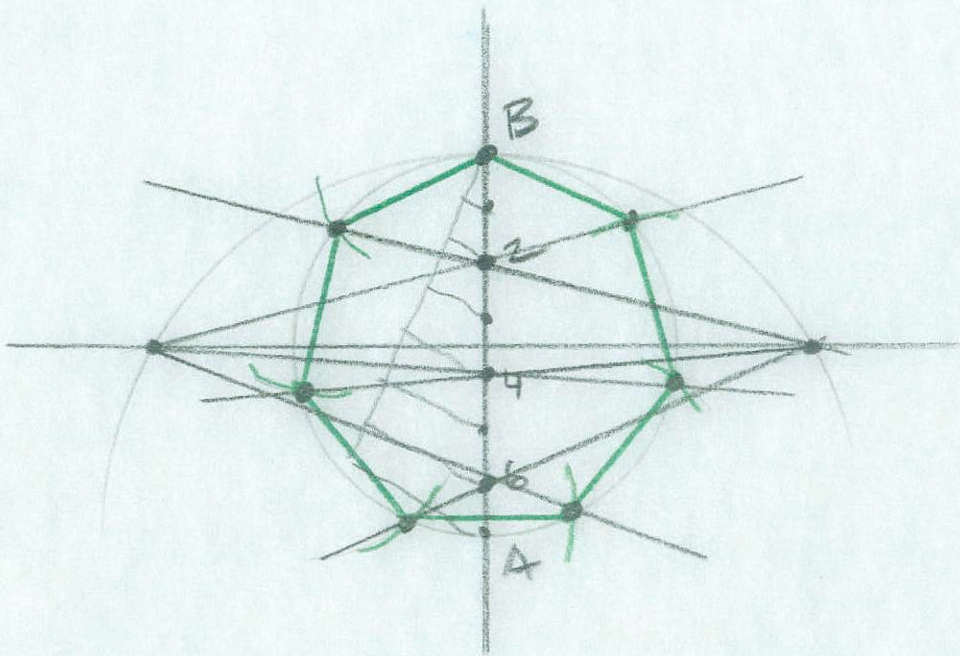

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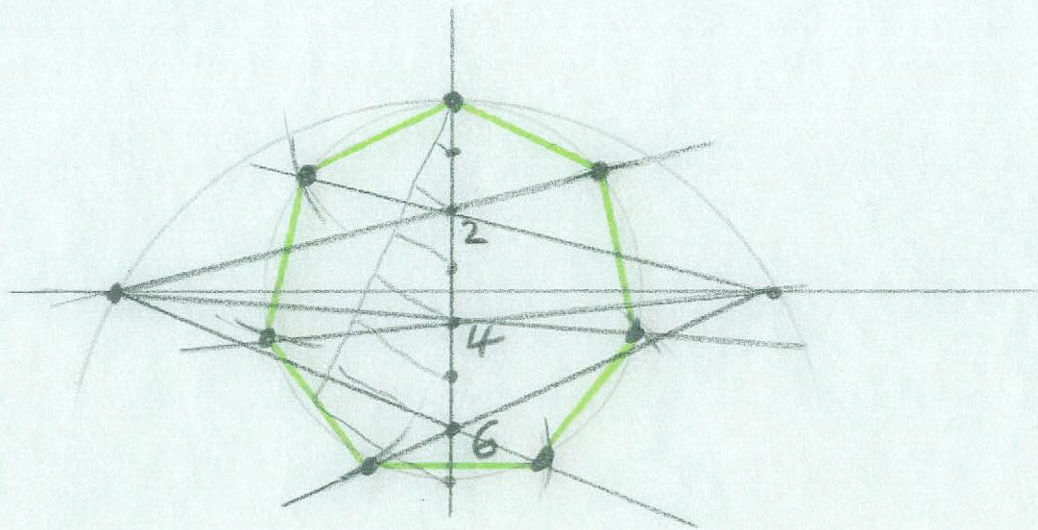
2
4
6

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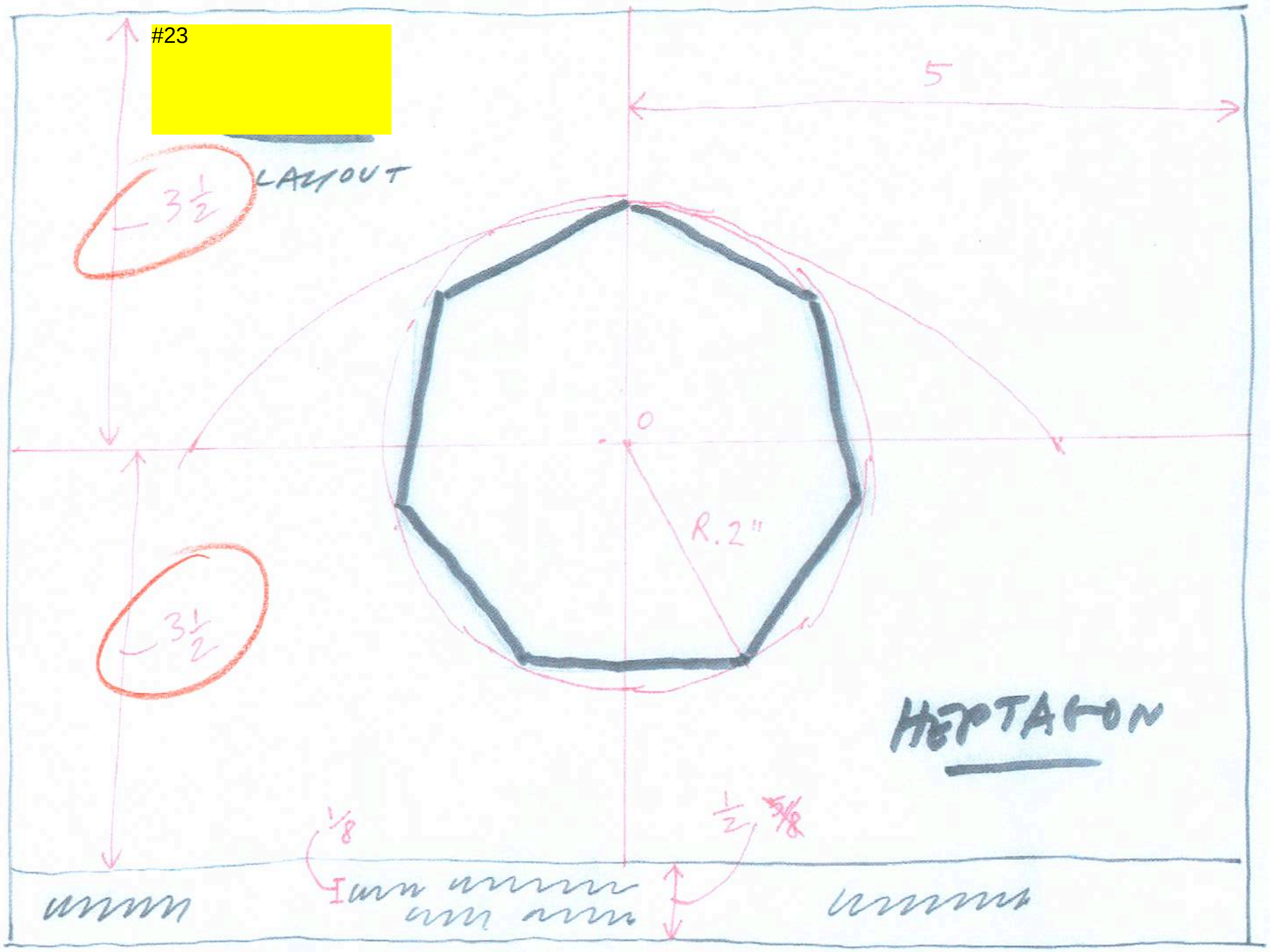

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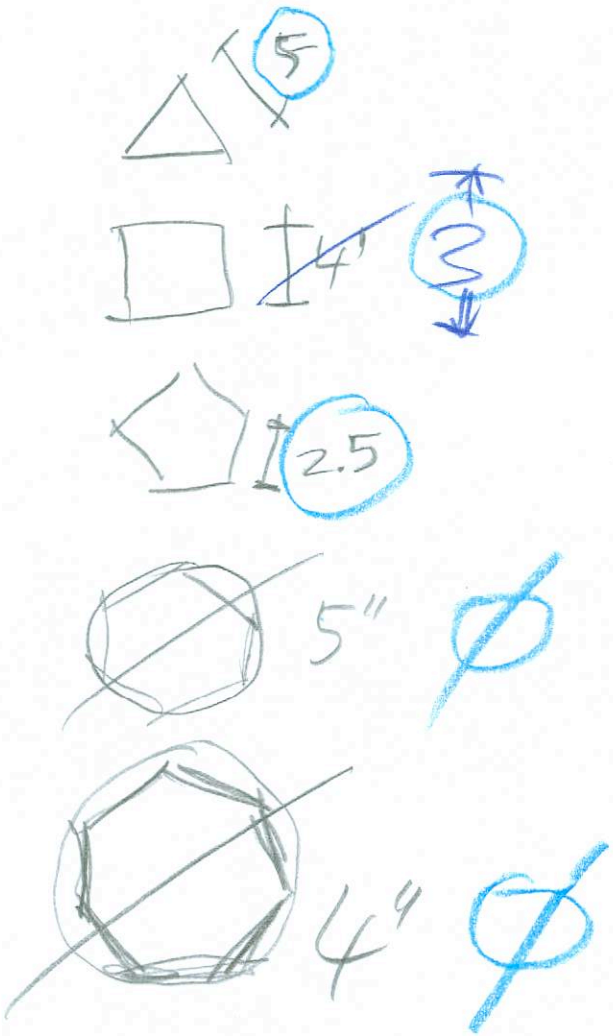

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