TECHNICAL DRAWING 7/02/2025

POLYGON

- **A POLYGON** : is a plane figure that is bounded by a finite chain of straight line segment closing in a loop to form a closed. The segments are called it edges or sides and the points where two edges meet are called the polygon vertices (singular vertex) or corners. However, the interior of the polygon is sometime called the body.
- **Polygon**: is any shape made up of straight lines that can be drawn on a flat surface, like piece of paper. Such shapes include square, rectangle, triangles, pentagon etc.
- **Polygon**: could also be a geometrical figure bounded by three or more side.

TYPES OF POLYGON

There are two major types of polygon. Thus are:

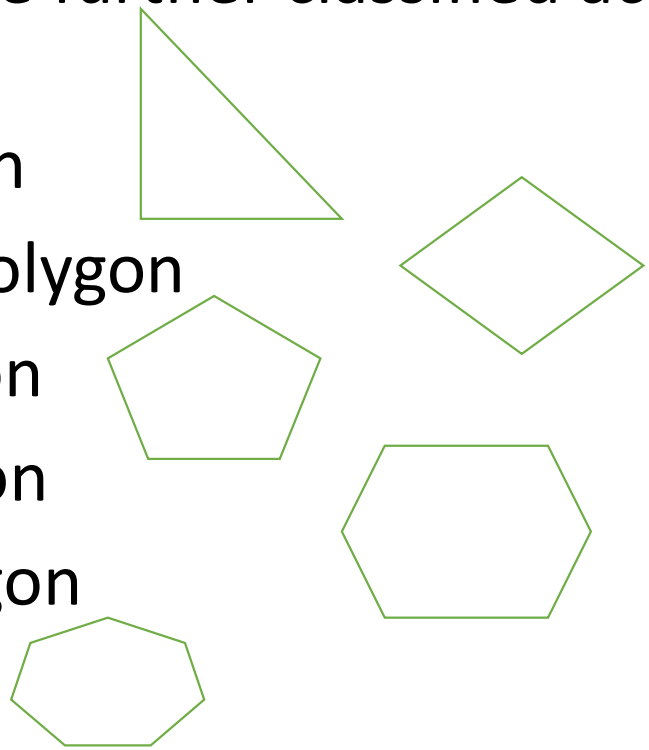
1. Regular polygon
2. Irregular polygon

Regular polygon: are polygon with equal angles and side

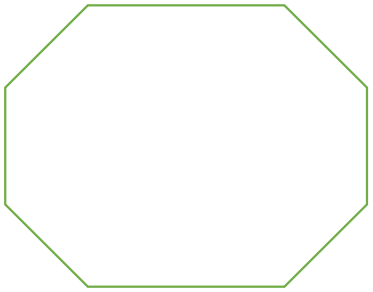
Irregular polygon: are polygon with unequal angles and sides

However, polygon are further classified according to the number of their side

1. Triangle 3 sides polygon
2. Quadrilateral 4 sides polygon
3. Pentagon 5 side polygon
4. Hexagon 6 sides polygon
5. Heptagon 7 sides polygon



6. Octagon 8 sides polygon



PROPERTIES OF POLYGON

The main properties which are important in polygons are

- The number of sides of the shape
- The angles between the sides of the shape
- The length of the sides of the shape

however, polygon are often define by the number of side the have. Therefore, the formula for finding out the total (or sum) of internal angles for any polygon is (number of side – 2) x 180^0

EXAMPLE

For a pentagon (a five – sided shape) the calculation would be

$5 - 2 = 3$

$3 \times 180 = 540^0$

$\therefore$ The sum of interior angles for any (not complete) pentagon is 540^0

Furthermore, if the shape is a regular polygon (all angles and length of the side are equal) then you can simply divide your answer from above, with the number of sides to fine each internal.

$$540^0 = 108^0$$

A regular pentagon therefore has five angle each equal to 108^0

SCALE

A SCALE: is a tool for measuring lengths and transferring measurement at a fix ratio of length. Scale means the proportion or ratio between the dimension adopted for the drawing and the corresponding dimension of the object.

TYPES OF SCALE

There are three types of scale depending upon the proportion it indicates; thus are:

1. Plain scale
2. Diagonal scale
3. Vernier scale

Metric measurements

- 10 millimeters (mm) = 1 Centimeter (cm).
- 10 Centimeters (mm) = 1 Decimeter (dm).
- 10 Decimeter (dm) = 1 Meter (m).
- 10 Meter (m) = 1 Decameter (dam).
- 10 Decameter (dam) = 1 Hectometer (hm).
- 10 Hectometers (hm) = 1 Kilometer (Km).
- 1 Hectare = 10,000 m^2

FULL SIZE: this is the actual dimension of the object. It

Scale 1:1. This means every millimetre on the drawing paper represents 1mm of the actual object.

SCALE REDUCTION: many objects must be drawn to reduce scales because they are too large to be drawn full size conveniently.

- Scale 1:2: This means every millimetre on the drawing paper represents 2mm of the actual object.
- Scale 1:5. This means every millimetre on the drawing paper represents 5mm of the actual object.

SCALE REDUCTION: many objects must be drawn to reduce scales because they are too large to be drawn full size conveniently.

- Scale 1:50. This means every millimetre on the drawing paper represents 50mm of the actual object.
- Scale 1:100. This means every millimetre on the drawing paper represents 100mm of the actual object.
- Scale 1:1000. This means every millimetre on the drawing paper represents 1000mm of the actual object.

CONCEPT OF ENLARGEMENT AND REDUCTION OF A PLANE FIGURE

A PLANE FIGURE: is a flat, two – dimensional surface with no thickness. A Cube for example has 6 plane.

AN ENLARGEMENT: is the state at which the original dimension of an object increased in proportion.

REDUCTION: is the state at which the original dimension of an object is reduced in a proportion.

TO DRAW A SQUARE HAVING HALF THE AREA OF A GIVEN SQUARE

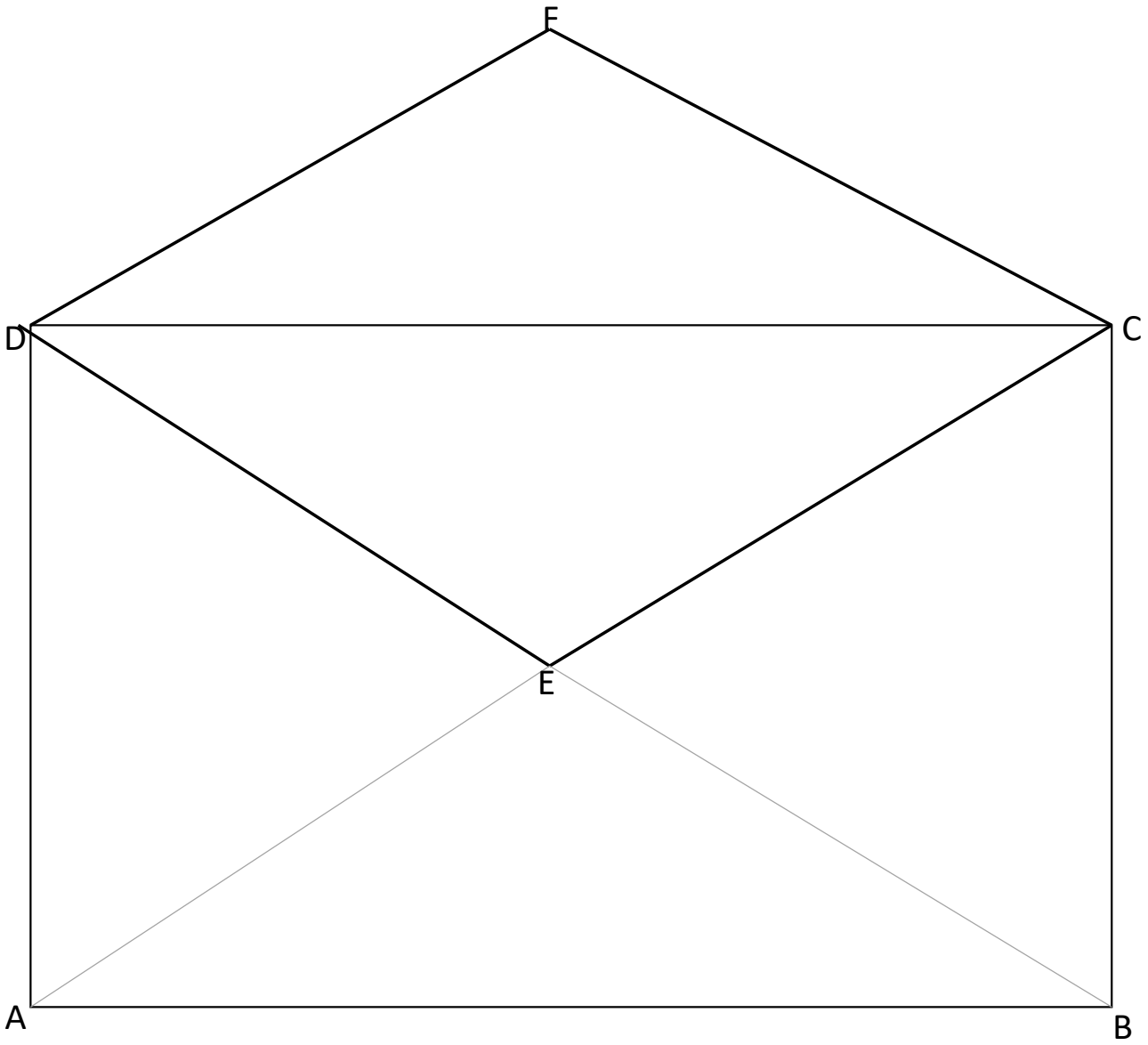
The following steps are to be follow:

STEP 1: draw the given square **ABCD.**

STEP 2: draw the diagonals AC and **BD.** The diagonal intersection at E.

STEP 3: draw the required square **DECF.**

1



HOW TO DRAW A SQUARE HAVING TWICE THE GIVEN SQUARE

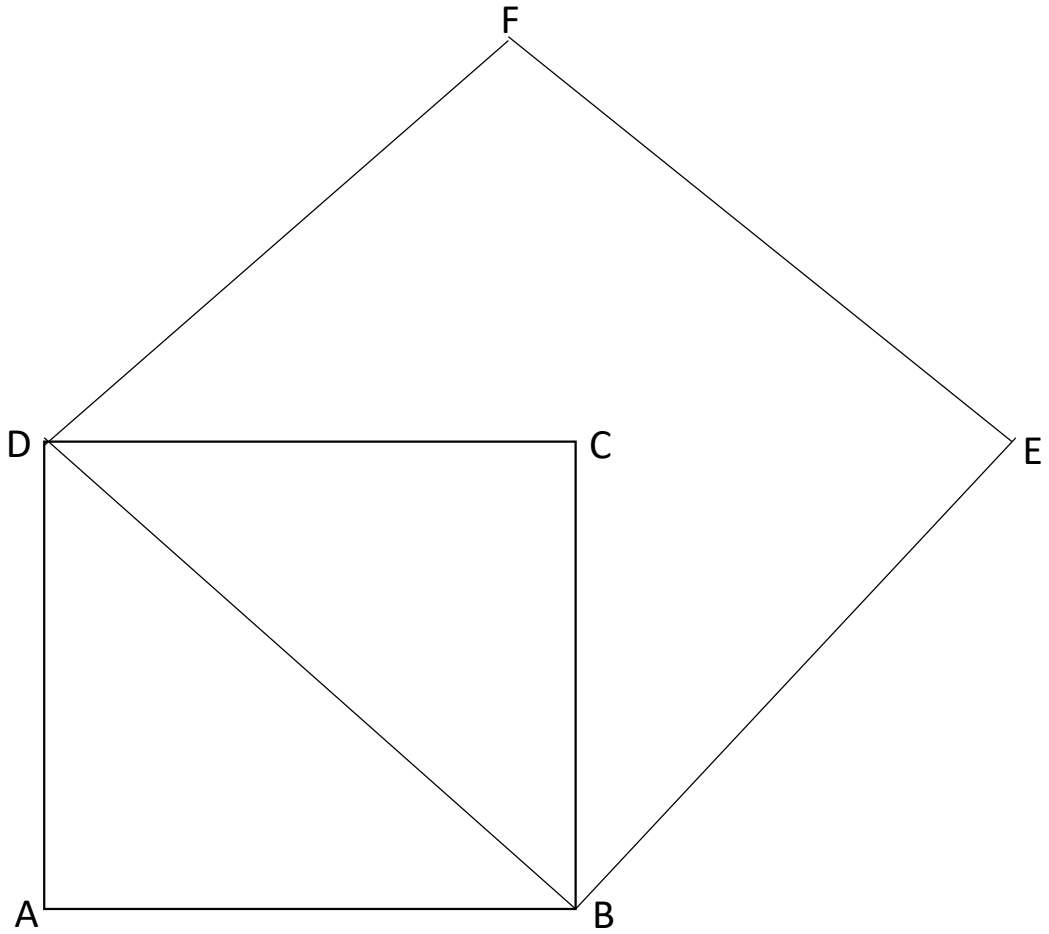
FOLLOW THE FOLLOWING STEPS:

Step 1: draw the given square ABCD.

Step 2: draw the diagonal BD, which is the length of the side required square.

Step 3: Construct the square on the diagonal BD. BEFD is the required square.

2



HOW TO DRAW A SIMILAR TO ABCDE, ENLARGED SO THAT AB IS 60 MILIMETER

The following steps are follow:

STEP 1: Draw the polygon. Make AB 45 millimeters

STEP 2: Draw AB 60 millimeters long as required.

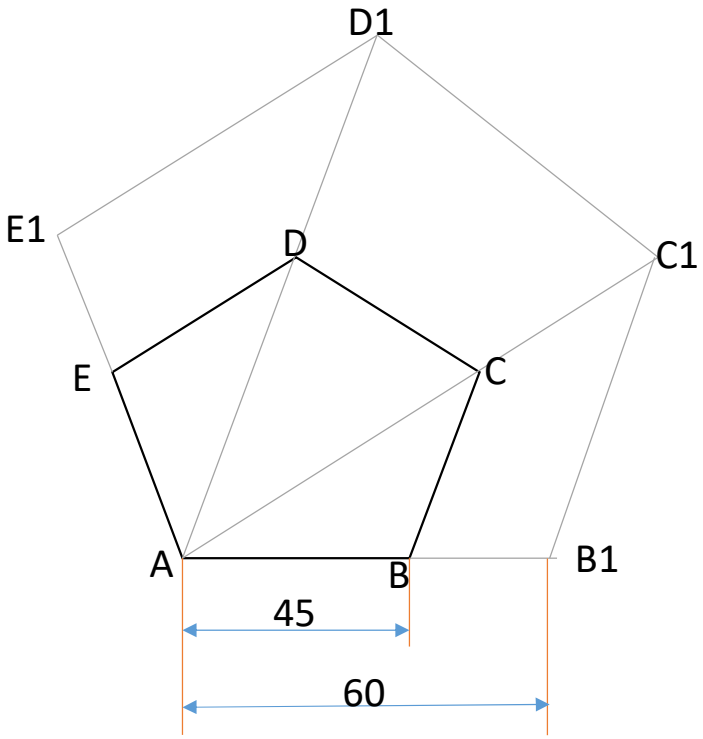
STEP 3: Radiate lines from A through the corners CD and E

STEP 4: Draw BC parallel to BC

STEP 5: Draw CD parallel to CD

STEP 6: Draw DE parallel to DE to complete the enlargement.

Frf



How to draw a figure similar to another with the side reduced in a given ratio

STEP 1: let the figure be ABCD and the ratio 5:3

STEP 2: mark point P any convenient distance from the figure.

STEP 3: radiate lines from P to A, B, C, D.

STEP 4: divide PA into 5 equal parts.

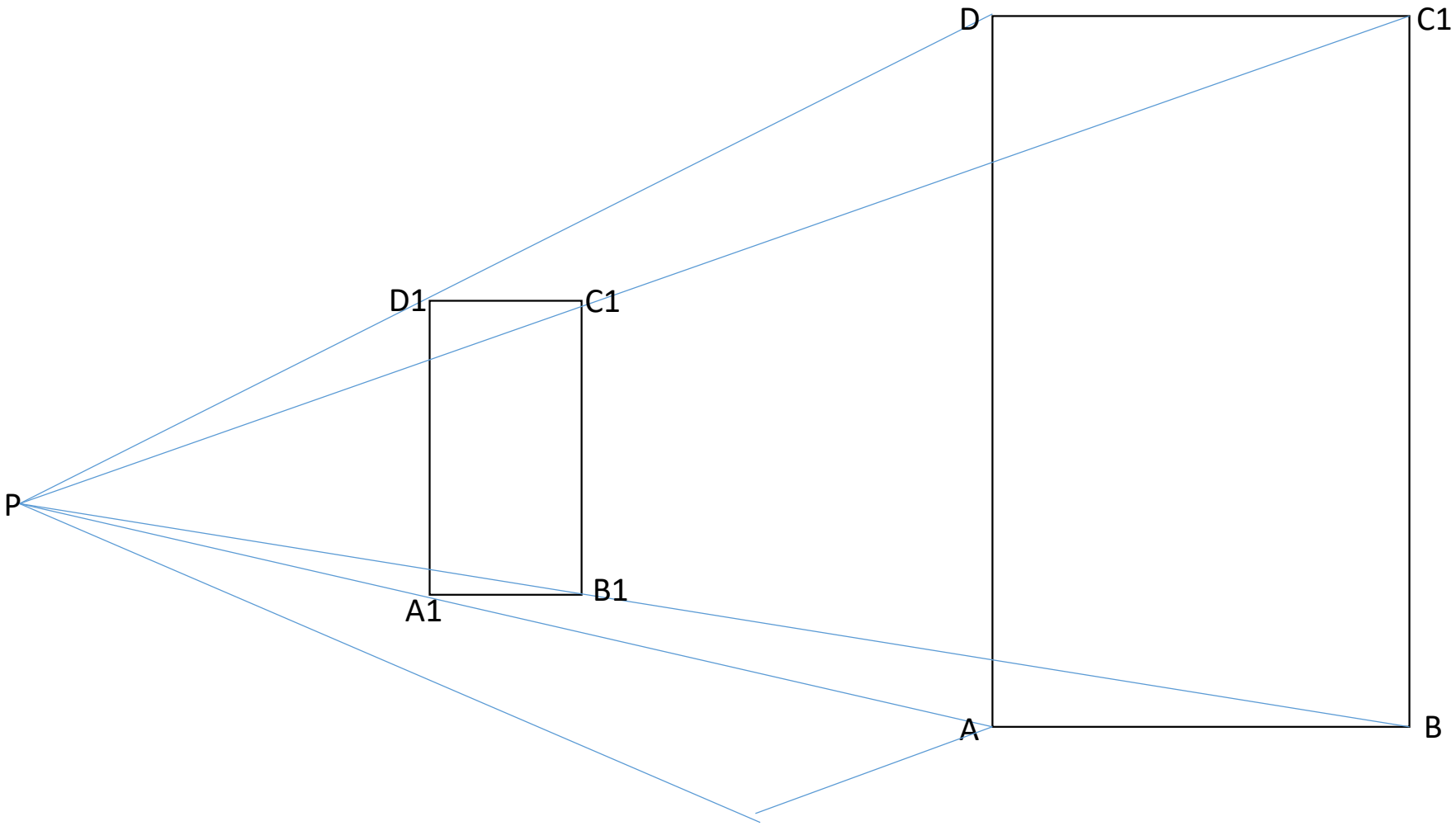
STEP 5: draw a line AD from unit 3 (A1) parallel to AD.

STEP 6: draw DC parallel to DC.

STEP 7: draw CB parallel to CB.

STEP 8: draw BA parallel to BA, to complete the reduced figure.

How to draw a figure similar to another with the side reduced in a given ratio



TANGENT AND TANGENCY 8/02/2025

TANGENT TO A CIRCLE:

A tangent to a circle: The word *tangen*t comes from the Latin word meaning "touching." therefore a tangent to a circle is a line that touches the circle at one point, which is known as Tangency. At the point of Tangency, Tangent to a circle is always perpendicular to the radius.

Point of Tangency: is the point where the tangent touches the circle.

The line that joins two infinitely close points from a point on the circle is a **Tangent**. In other words, we can say that the lines that intersect the circles exactly in one single point are Tangents. **Point of tangency is the point where the tangent touches the circle.** At the point of tangency, **a tangent is perpendicular to the radius.**

PROPERTIES OF TANGENTS

Remember the following points about the properties of tangents-

- The tangent line never crosses the circle, it just touches the circle.
- At the point of tangency, it is perpendicular to the radius.
- A chord and tangent form an angle and this angle is same as that of tangent inscribed on the opposite side of the chord.
- From the same external point, the tangent segments to a circle are equal.

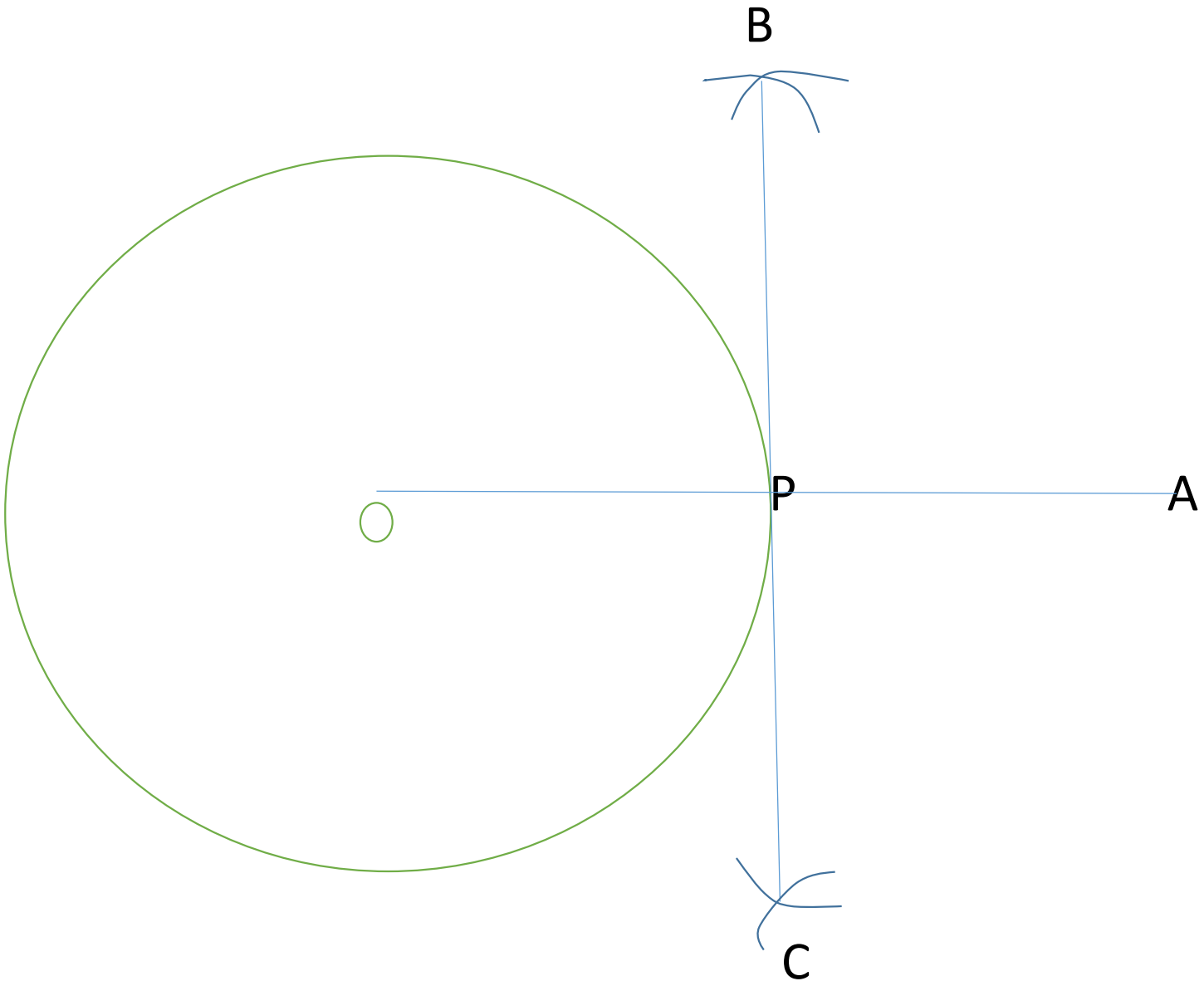
TO CONSTRUCT A TANGENT TO A CIRCLE AT A GIVEN POINT ON THE CIRCUMFERENCE 12/02/2025

STEP 1: Draw the circle with center **O.** indicate the given point P

STEP 2: Extend a line from **OP** outwards.

STEP 3: With center **P** and radius **OP** draw an arc to cut the extended line at **A**

STEP 4: Bisect **OA.** The bisector **BC** is the required tangent.


B
P
A
C

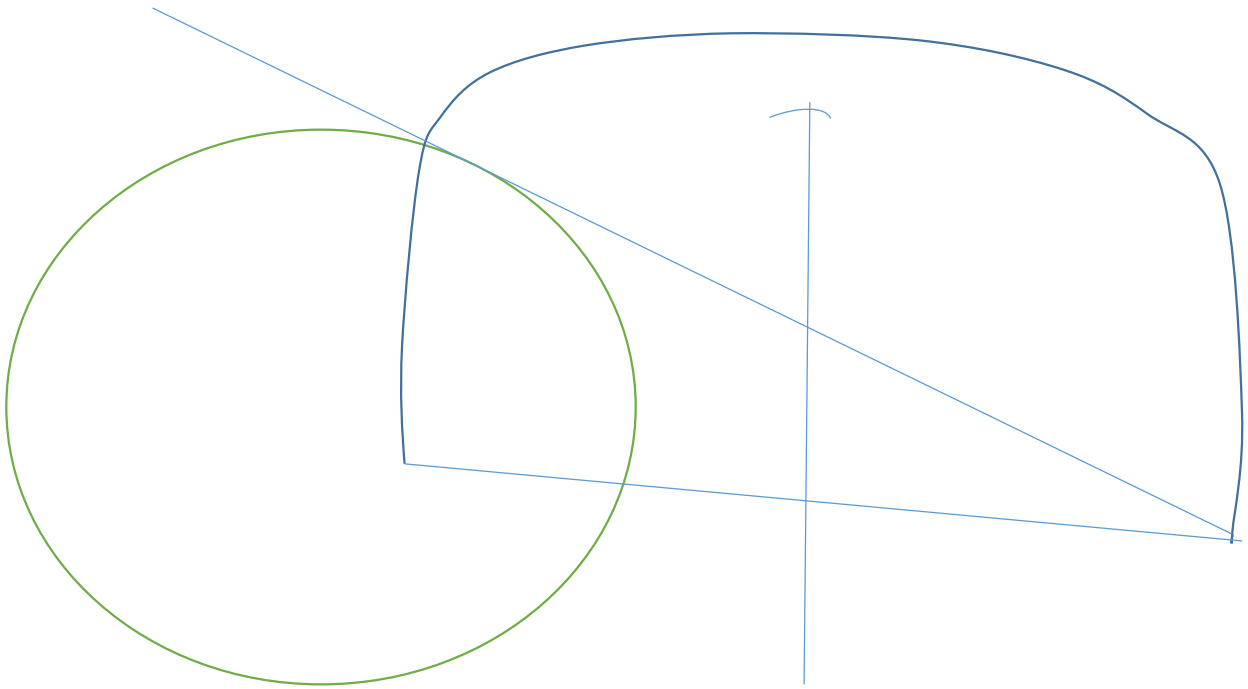
TO CONSTRCT A TANGENT ATO A CIRCLE FROM A GIVEN POINT OUTSIDE IT 15/02/2025

STEP 1: draw the circle with center O. indicate the given point P

STEP 2: draw line OP

STEP 3: construct a semicircle on OP to cut the circle at A

STEP 4: extend a line from P through A. this is the required tangent.



The answer should be NONE. Since the circles are not internally or externally tangent to begin with, Circles A and C and concentric circles E will not have any common internal or external tangents.

TO DRAW A COMMON EXTERNAL TANGENT TO TWO EQUAL CIRCLE

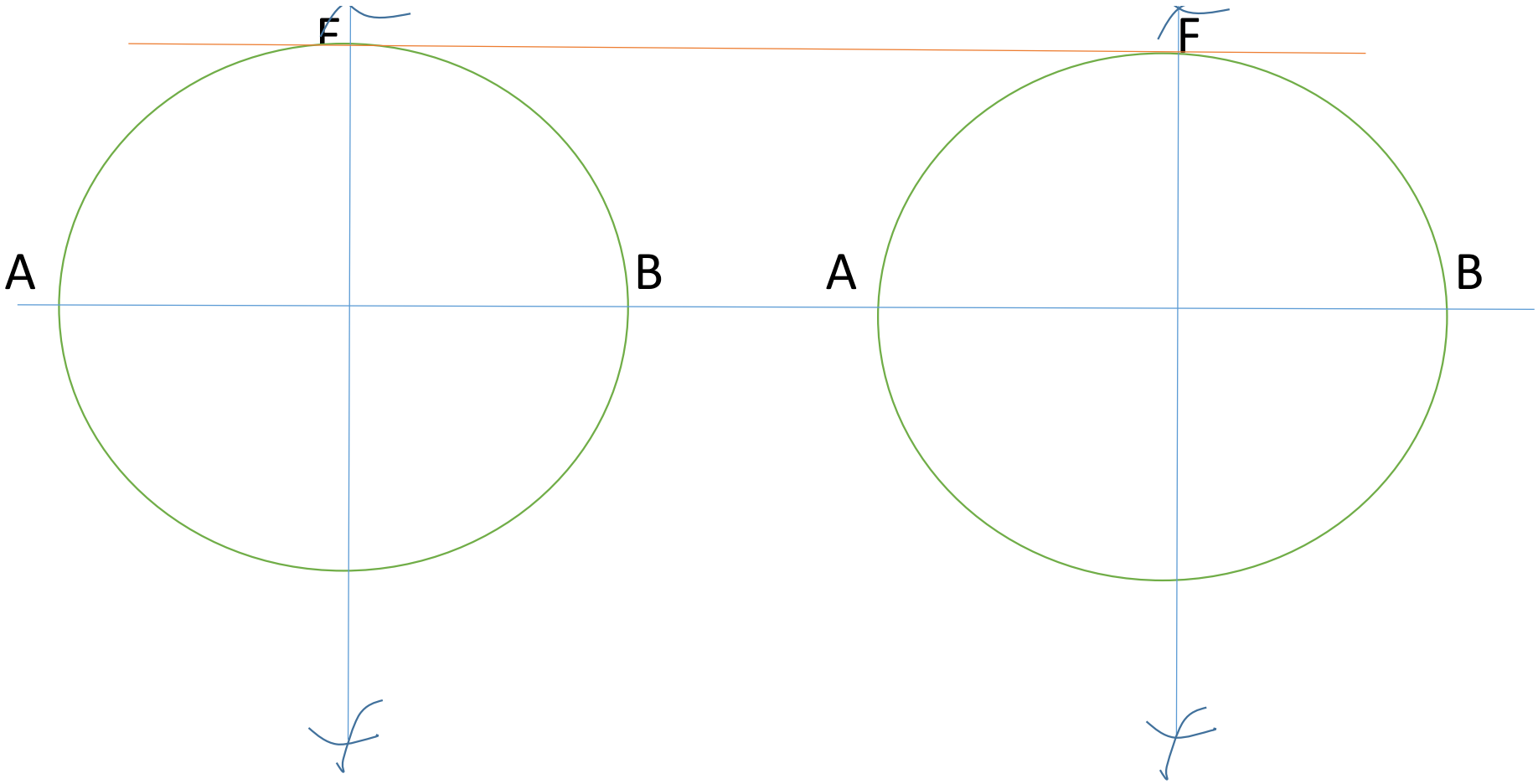
Follow the following steps below

STEP 1: Draw the given circle.

STEP 2: Draw a line through the centers of the circles

STEP 3: Bisect the diameters **AB.** The bisectors cut the circumference of the circles at E and **F.**

STEP 4: Draw a line through **E** and **F.** this is the required tangent.


F
A
B
F
A
B