EWCE 100
Spring 2023
Lecture 2: Geometric Drawing

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Topics to be Discussed

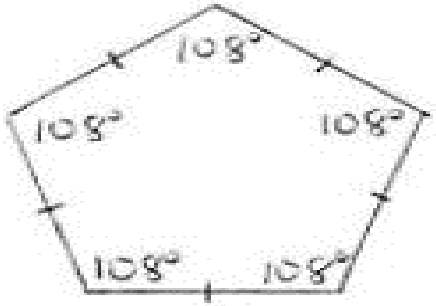
1. Regular Pentagon
2. Regular Hexagon
3. Regular Octagon
4. Ellipse
5. Parabola
6. Hyperbola

Regular Polygon: A regular polygon is a polygon that is equiangular (all angles are equal in measure) and equilateral (all sides have the same length).

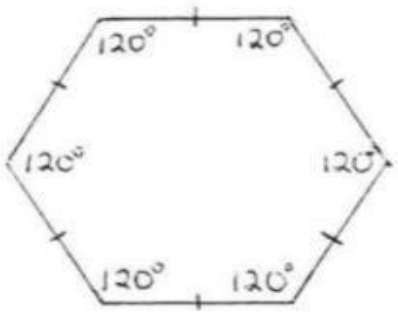
Regular Pentagon: It has five equal sides and five equal angles.

Regular Hexagon: It has six equal sides and six equal angles.

Regular Octagon: It has eight equal sides and eight equal angles. Each interior angle of a regular octagon is 135°.



Regular Pentagon

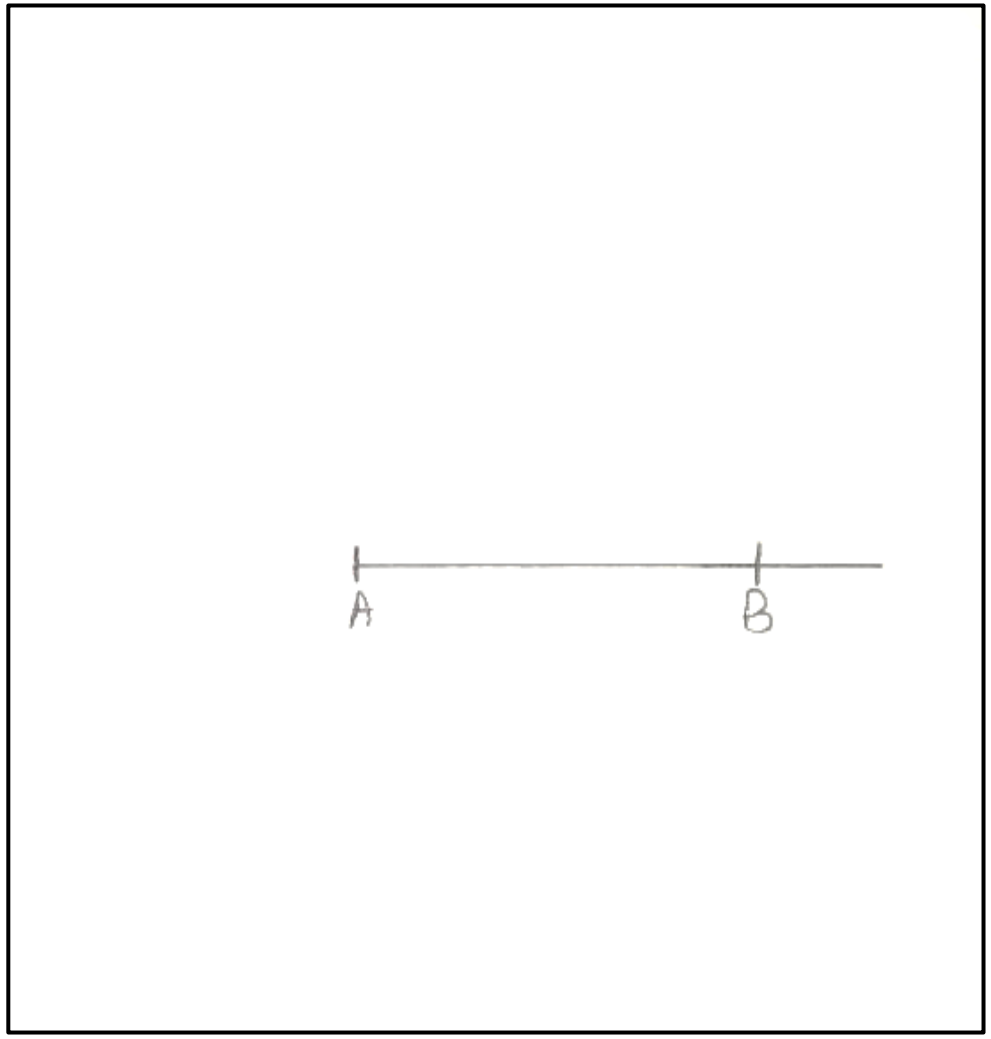


Regular Hexagon

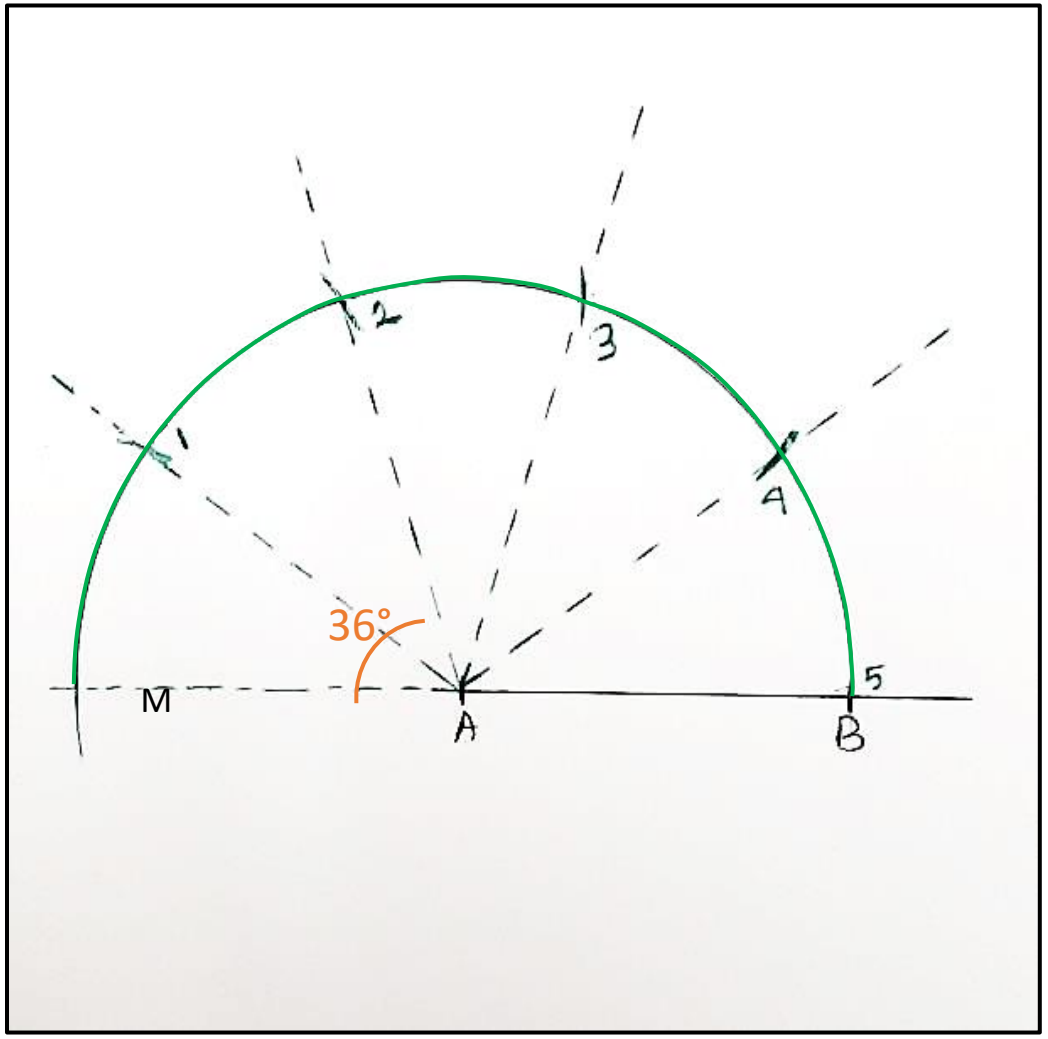


Regular Octagon

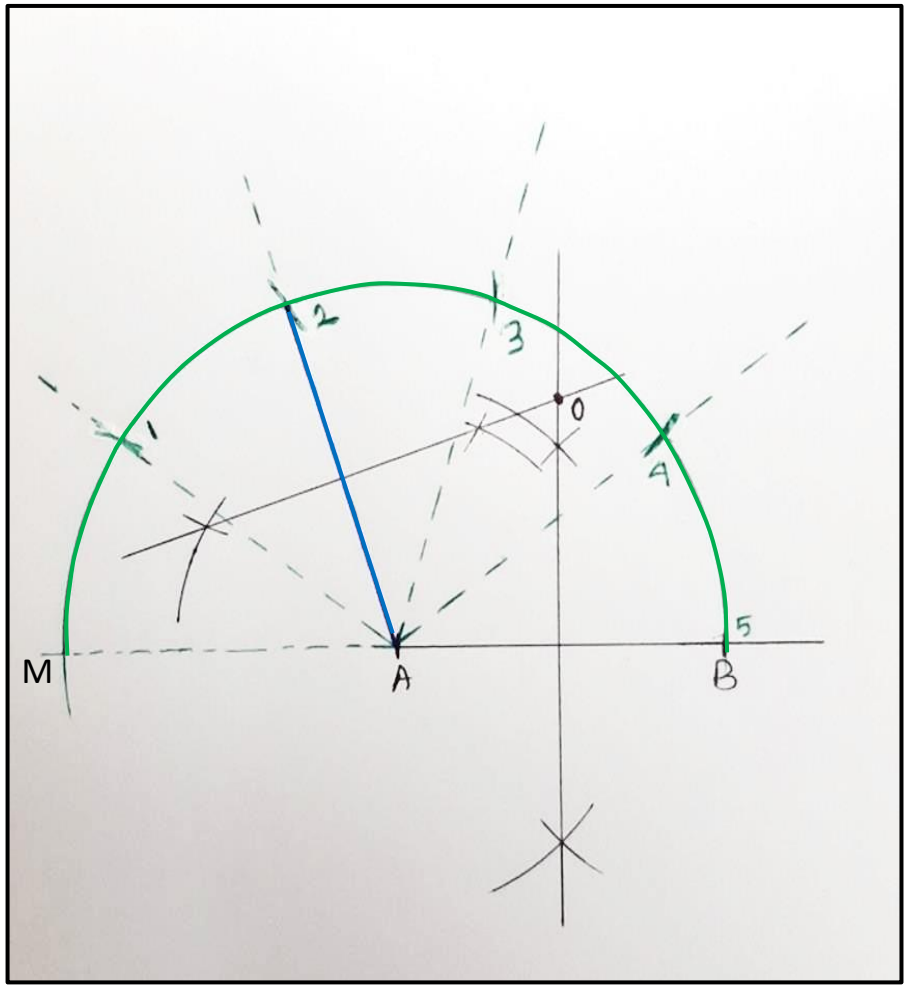
Regular Pentagon Drawing



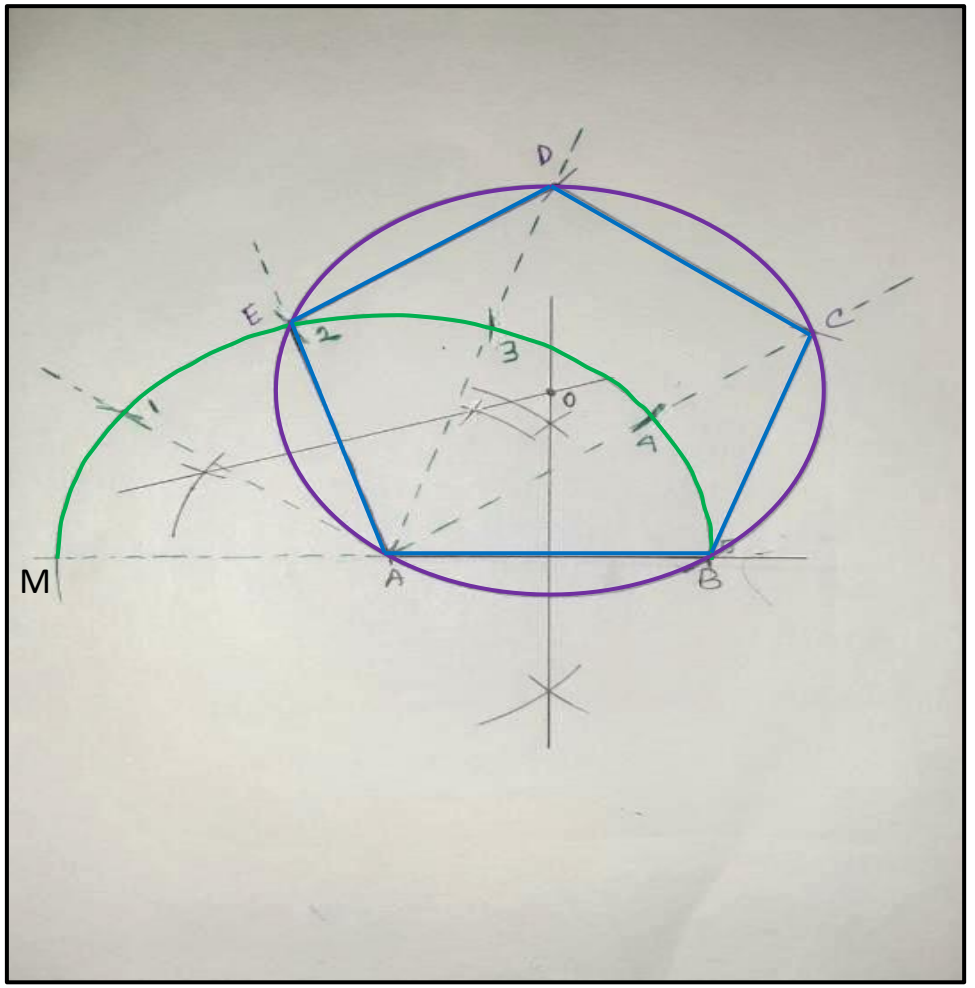
Step 1: Draw a line and take length AB with a scale, suppose the length AB=2 inch. For HW, use AB=1.5 inch



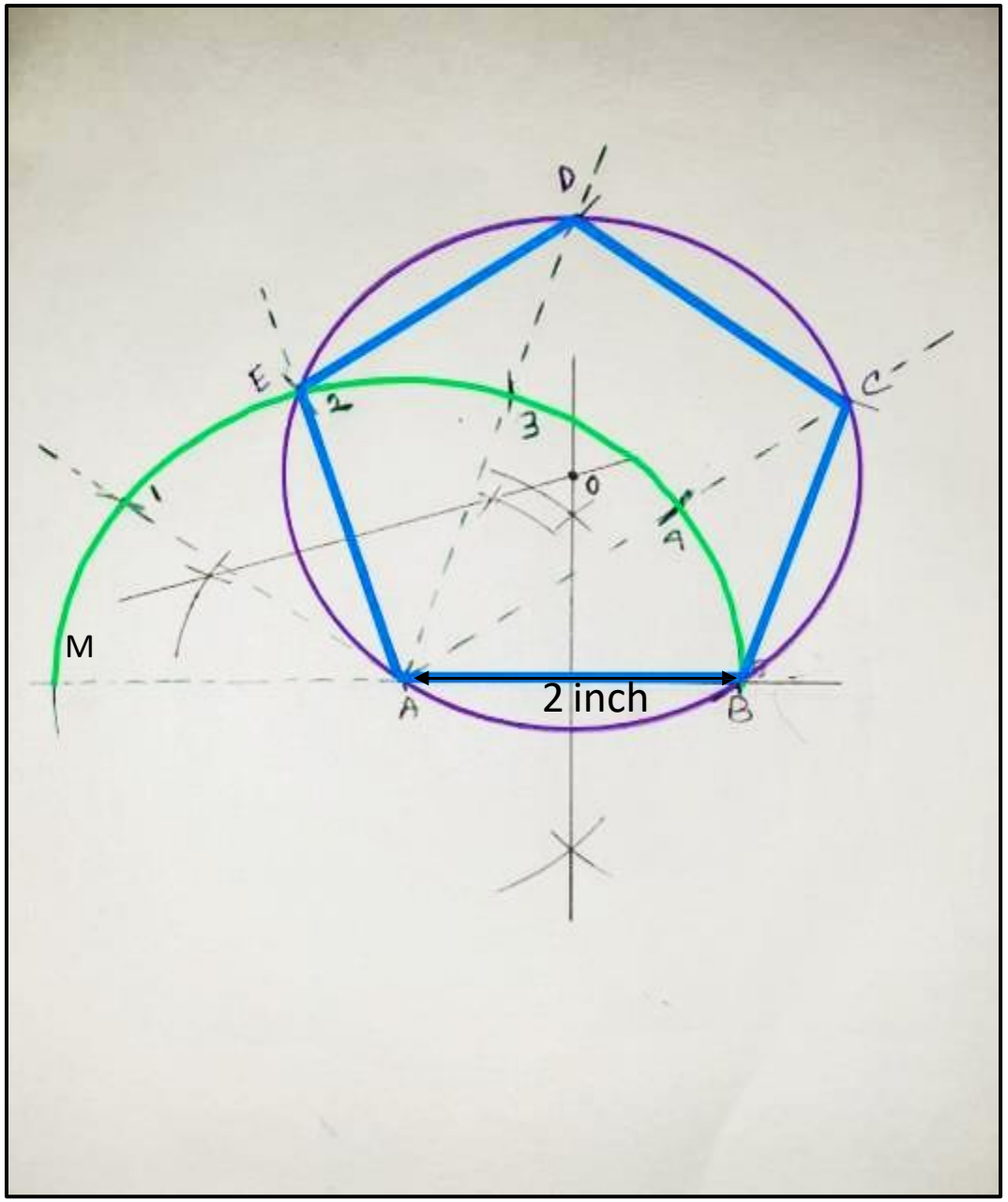
Step 2: Taking a length equal to AB draw a semi circle**(green color)** from point A and after drawing the semi circle, extend the BA line to point M (with dotted line). Now divide the semi circle in 5 equal portions (each portion is = 36 degree as five equal portion is 180/5 = 36 degree). Name the equal portions as 1,2,3,4,5. Join point A with points 1,2,3,4 by dotted line.



Step 3: Now draw a line joining the points A and 2 so we get the line A2**(blue color)**. Bisect the lines AB and A2 equally and suppose the bisect lines met at a point named as **O**.

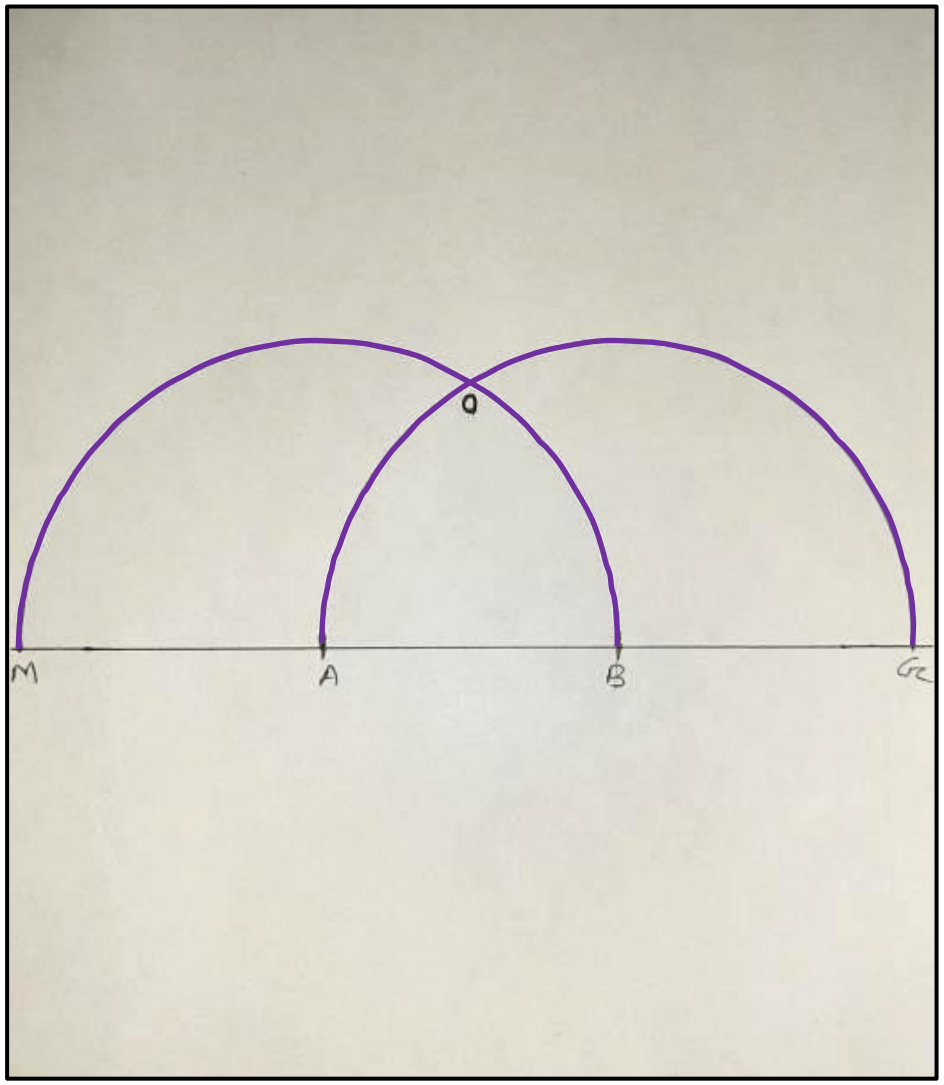


Step 4: Now taking the length OA draw a full circle**(purple color)** from the centre point O that intersects the semi circle at point E and the dotted lines intersect with circle at points D and C. Now , join the points E,D; D,C; C,B so we get the lines ED,DC and CB.

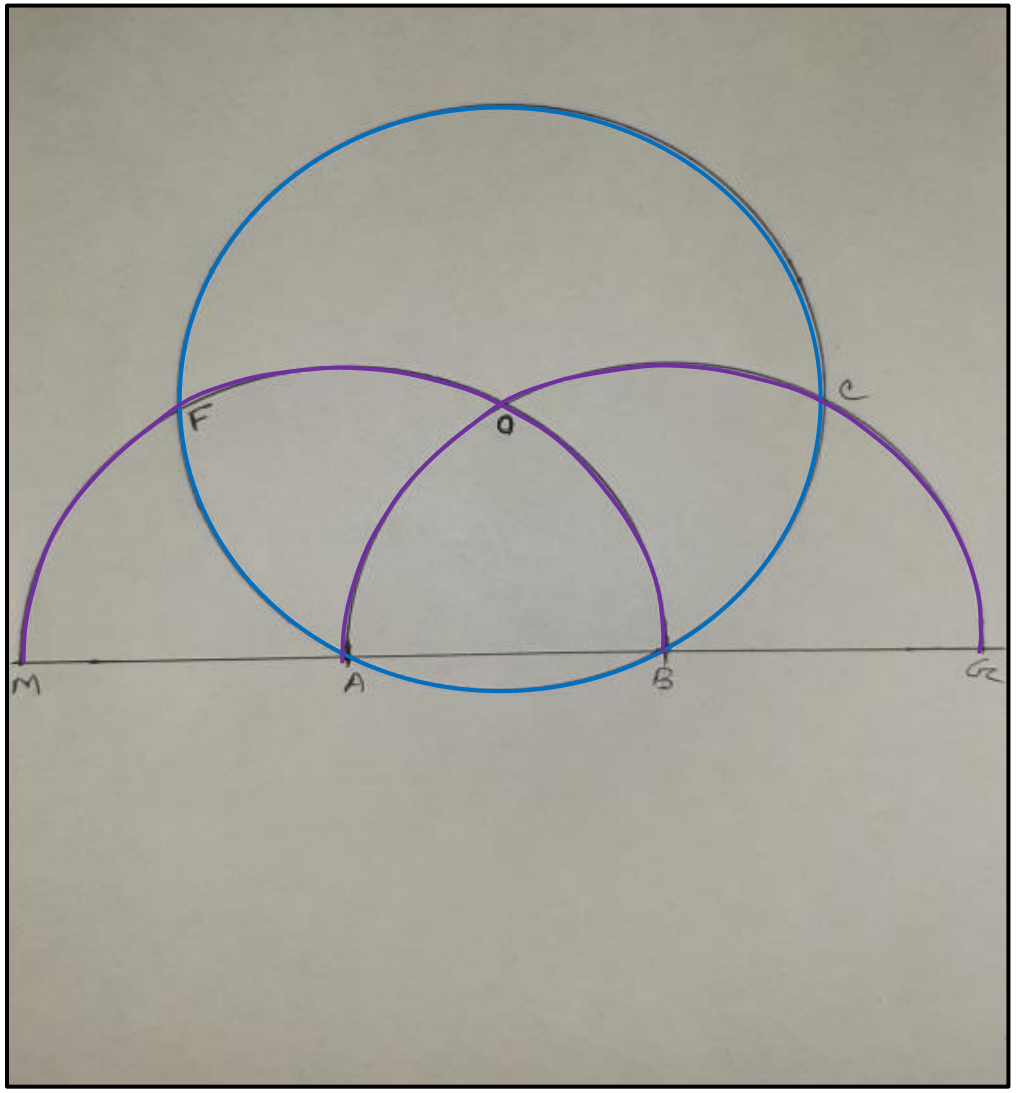


So, The pentagon is ABCDE **(blue color).**

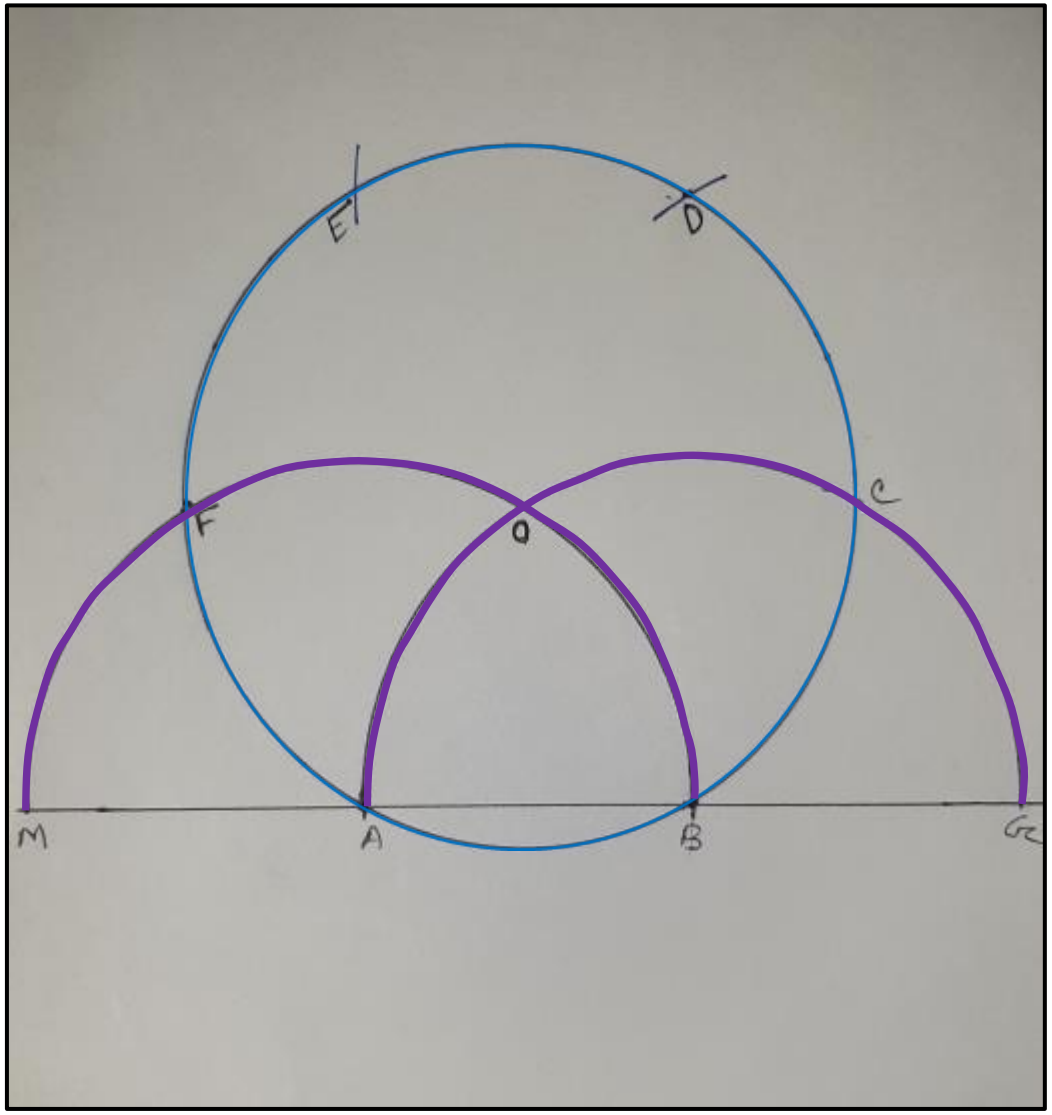
Regular Hexagon Drawing



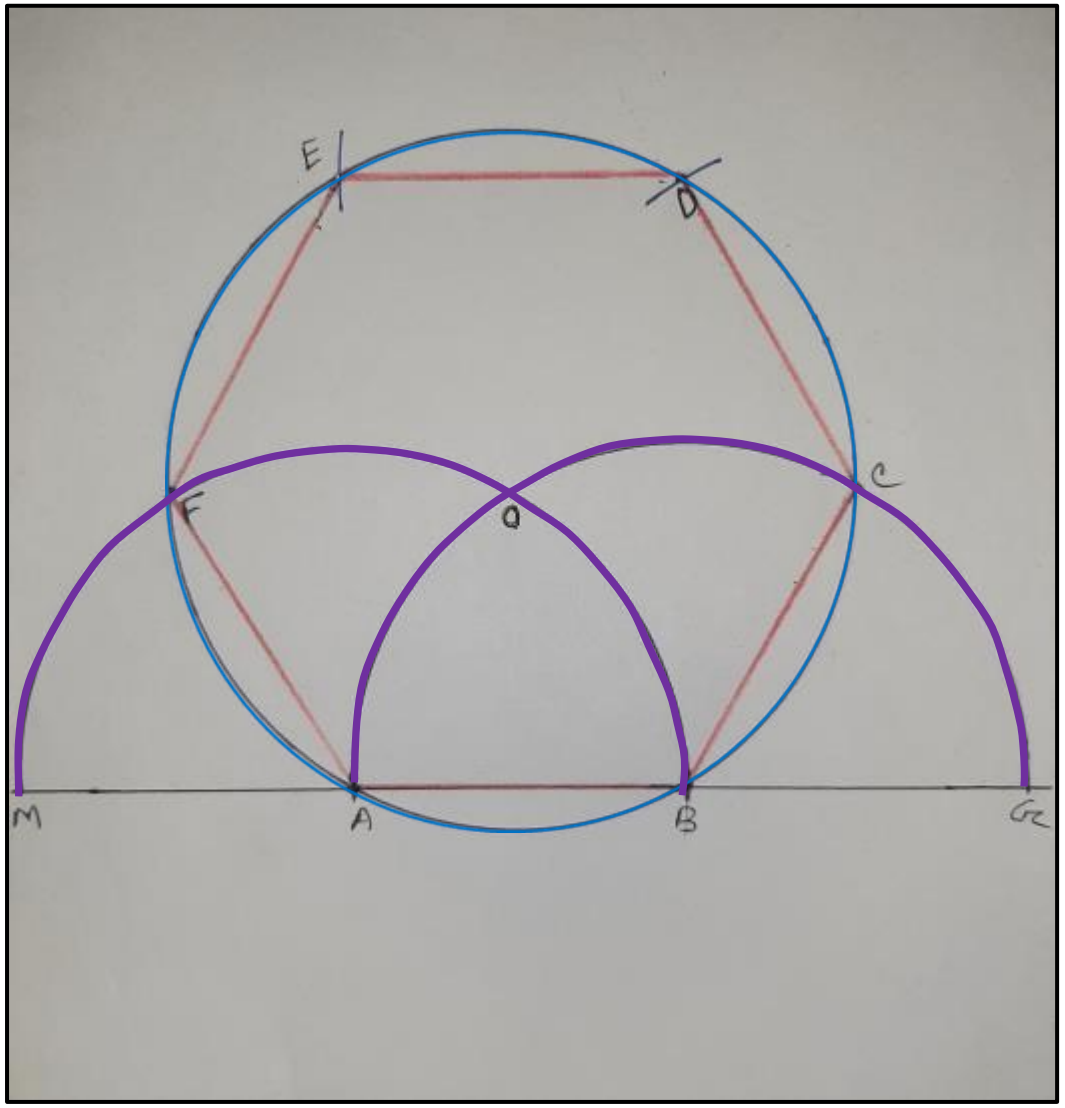
Step 1: Draw the line MG. Take a portion AB, suppose length AB=2 inch.Now taking the length AB draw a semi circle from point A**(purple color).** Then again draw a semi circle**(purple color)** from point B taking length equal to AB. Note: Use AB= 2.5 inch for HW



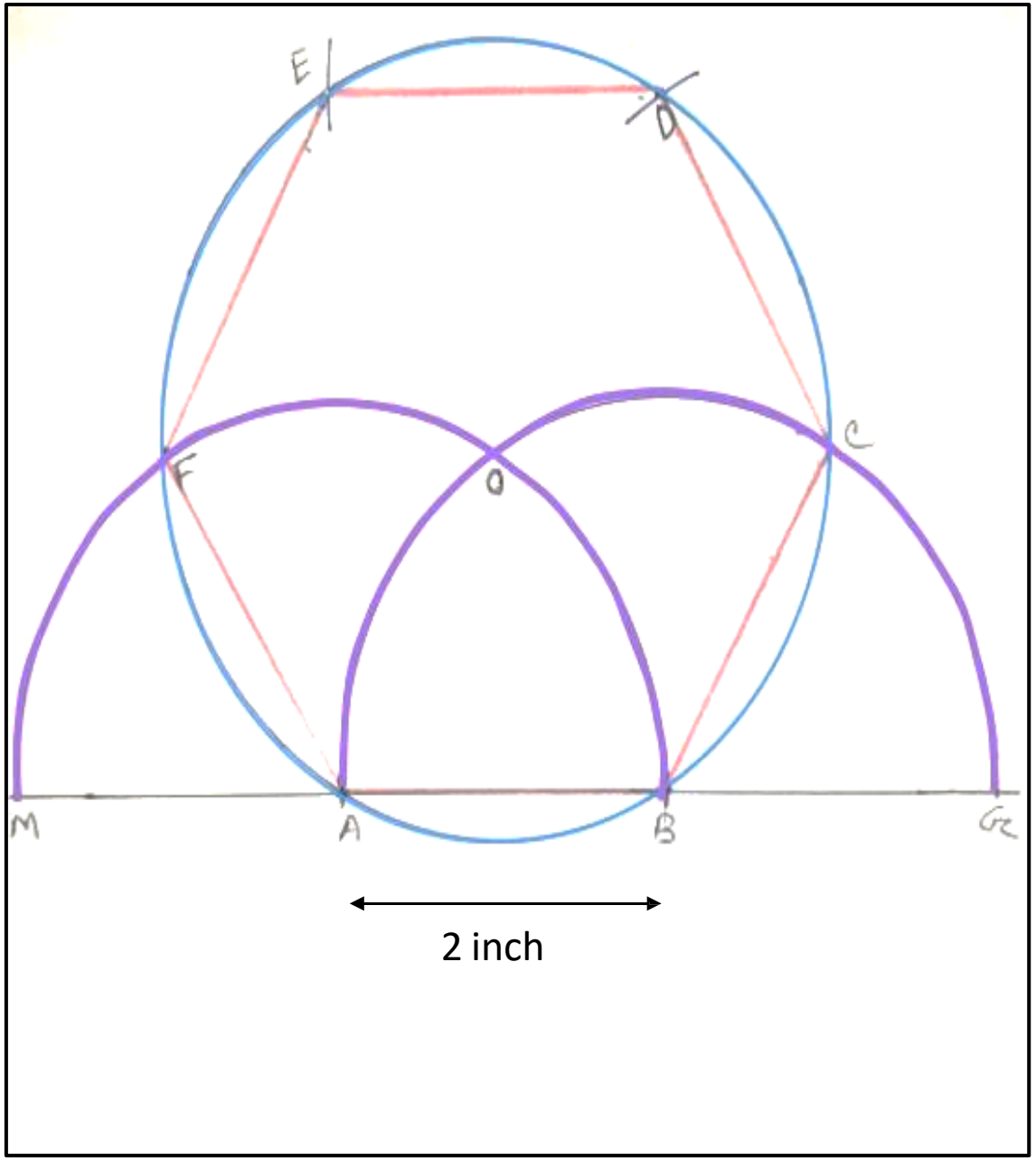
Step 2: The two semi circle intersect at point O. Now from point O, taking length equal to AB, draw a full circle**(blue color)** that intersect the semi circles at point F and C.



Step 3: Now taking length equal to AB, cut the portion D from point C, cut the portion E from point D.

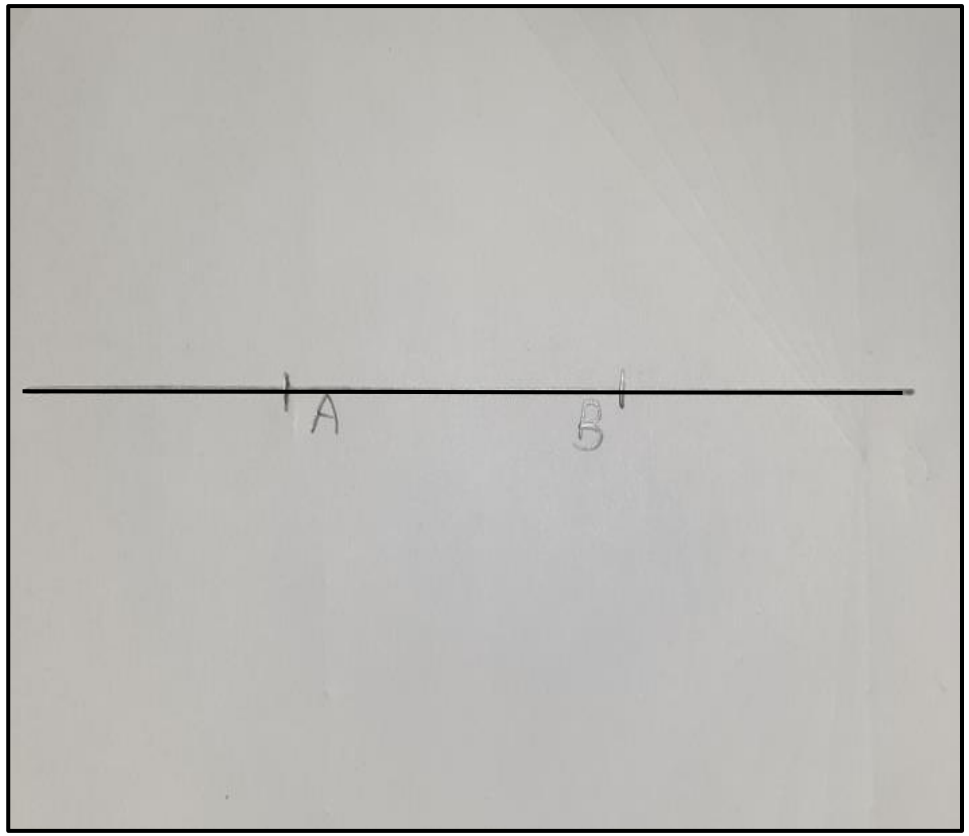


Step 4: Now join the points B,C; C,D; D,E; E,F and F,A so that we get the lines BC, CD, DE, EF and FA.



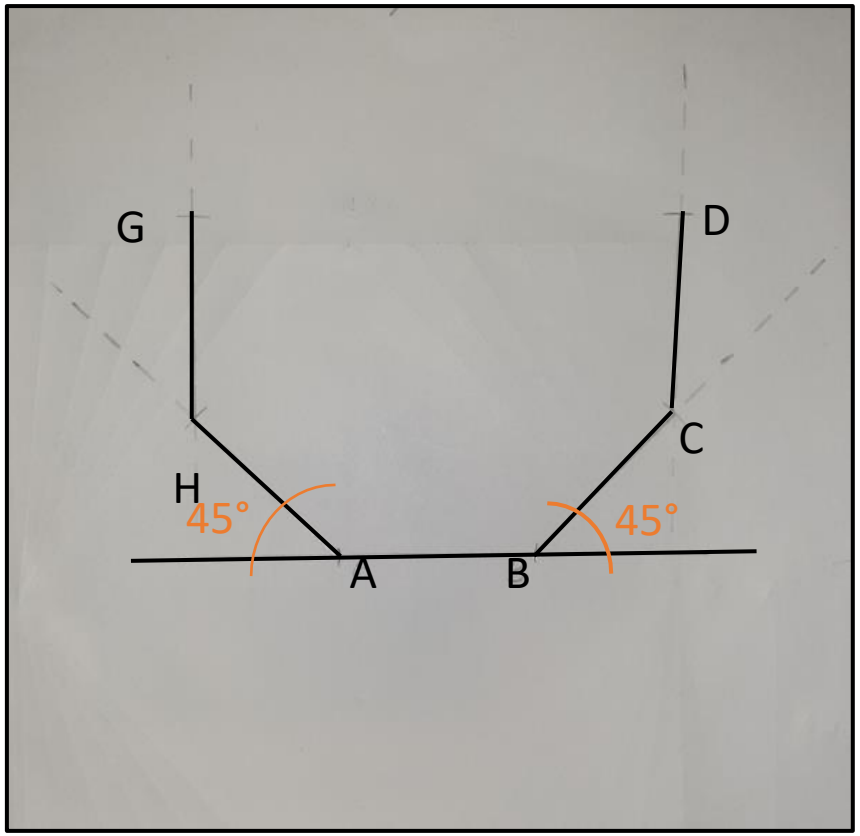
So the Hexagon is ABCDEF **(red color).**

Regular Octagon Drawing

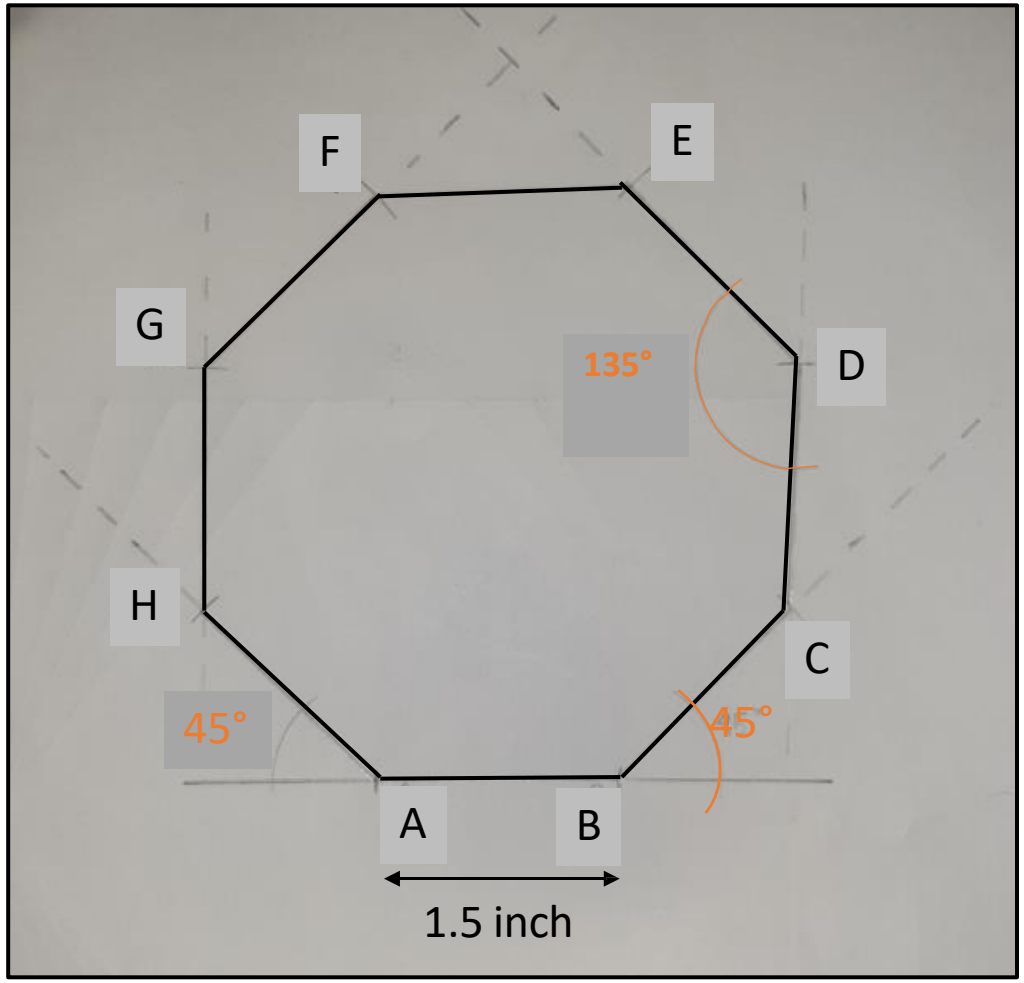


Step 1: Draw a line and take length AB=1.5 inch.

Note: Use AB= 2 inch for HW



Step 2: Draw 45 degree angle line from point A and B**(orange color)**. Then cut H from point A and C from point B equal to length AB. Join A,H and B,C. Now draw two 90 degree vertical lines from point H and C. Cut G from point H and D from point C equal to length AB. Join H,G and C,D so that we get the lines HG and CD.

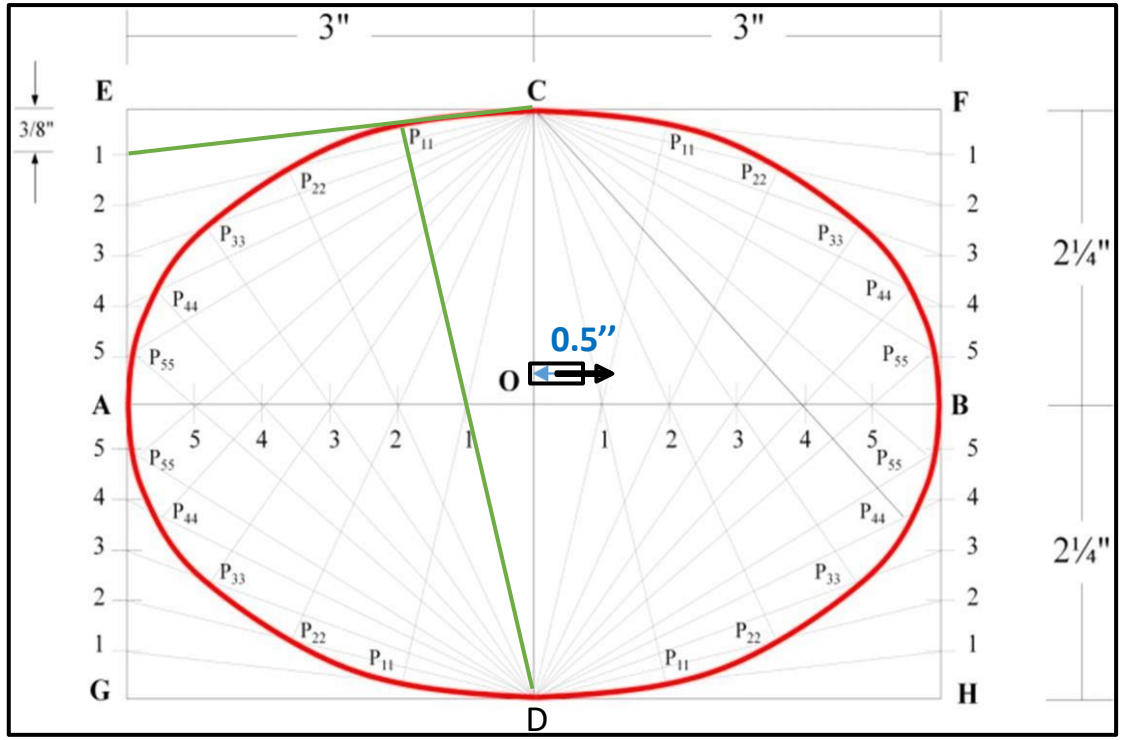


Step 3: Draw 45 degree angle line from point G and D. Then cut F and E equal to length AB from points G and D respectively. Join G,F;F,E and D,E so we get GF,FE and DE. The octagon is ABCDEFGH.

Ellipse Drawing

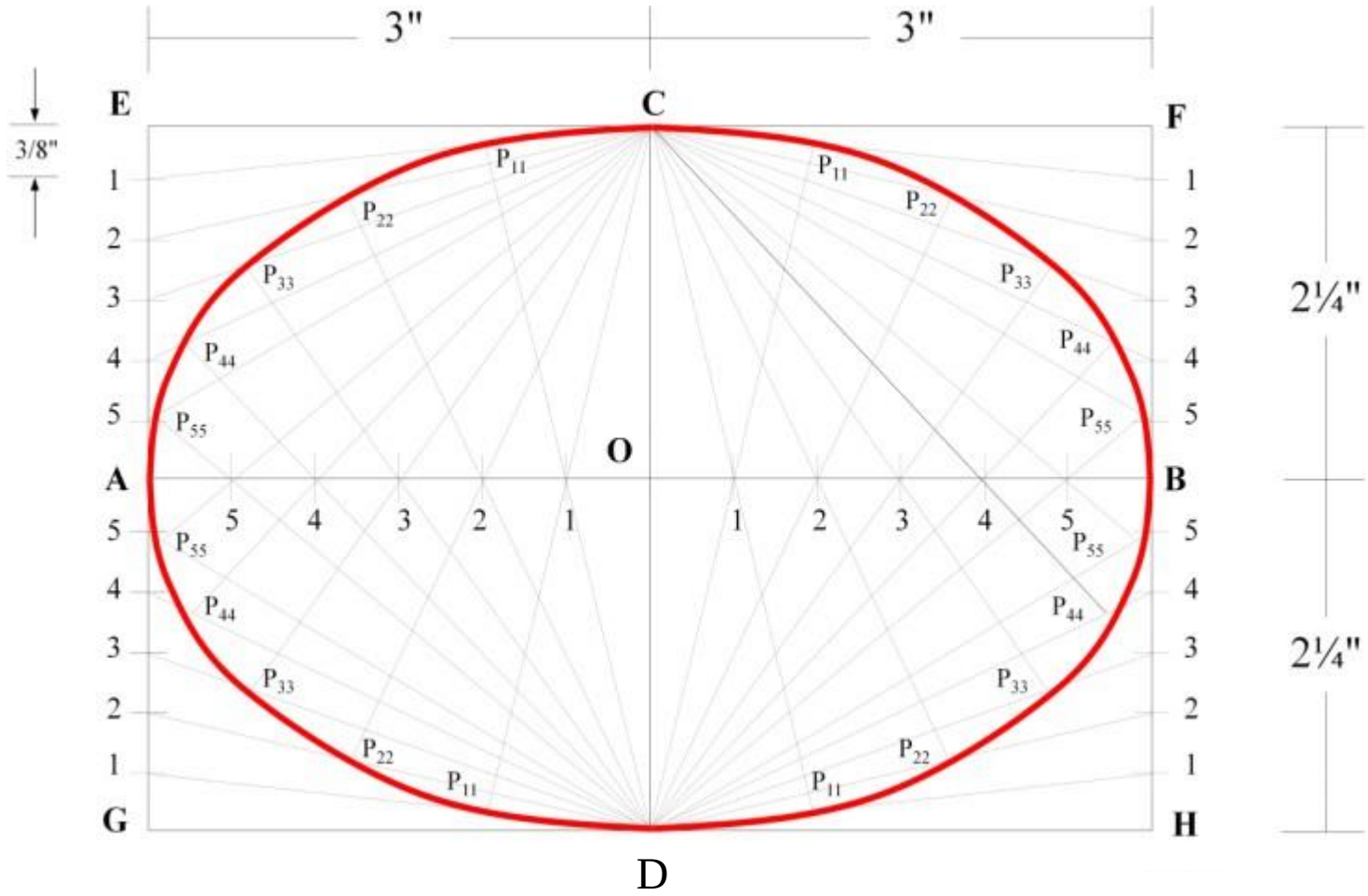
Step 1: Take major axis AB= 6 inch and minor axis CD= 4.5 inch and O is the axis centre.
Step 2: Draw two lines EG and FH parallel and equal to CD.
Step 3: Draw two lines EF and GH parallel and equal to AB.
Step 4: Now divide the lines EG and FH in 12 equal portions, each portion is 3/8 inch.
Step 5: Divide AB at 12 equal portions and each portion is 0.5 inch.
Step 6: Number the portions as shown in figure (1,2,3,4,5).
Step 7: Join point C and D to the points of the line EG and FH as shown in figure.
Step 8: Now join the lines as shown in figure. (for example join from D through point 1 to line C1**(green color)** and name the point P11. Do it for others to get point P22 to P55 as shown in figure.
Step 9: Then join all the points from step 8 that start with P. Finally the ellipse ACBD **(red color)** is shown in figure.

Only Bold the ellipse ACBD. Give necessary dimensions.



Major Axis = 6 inch
Minor Axis= 4.5 inch O = Axis centre

Use the dimensions for HW while drawing ellipse

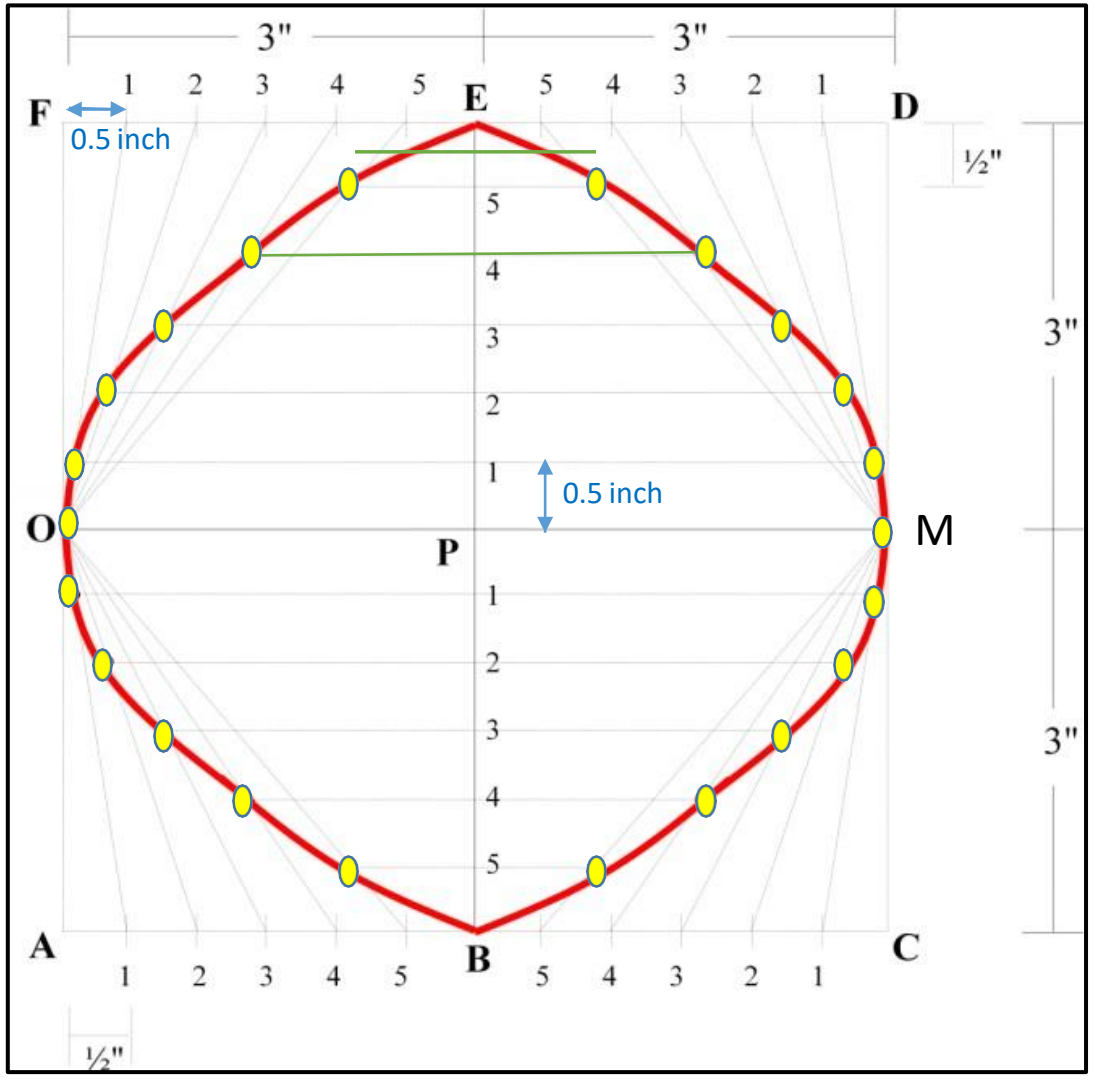


So the Ellipse is ACBD **(red color).**

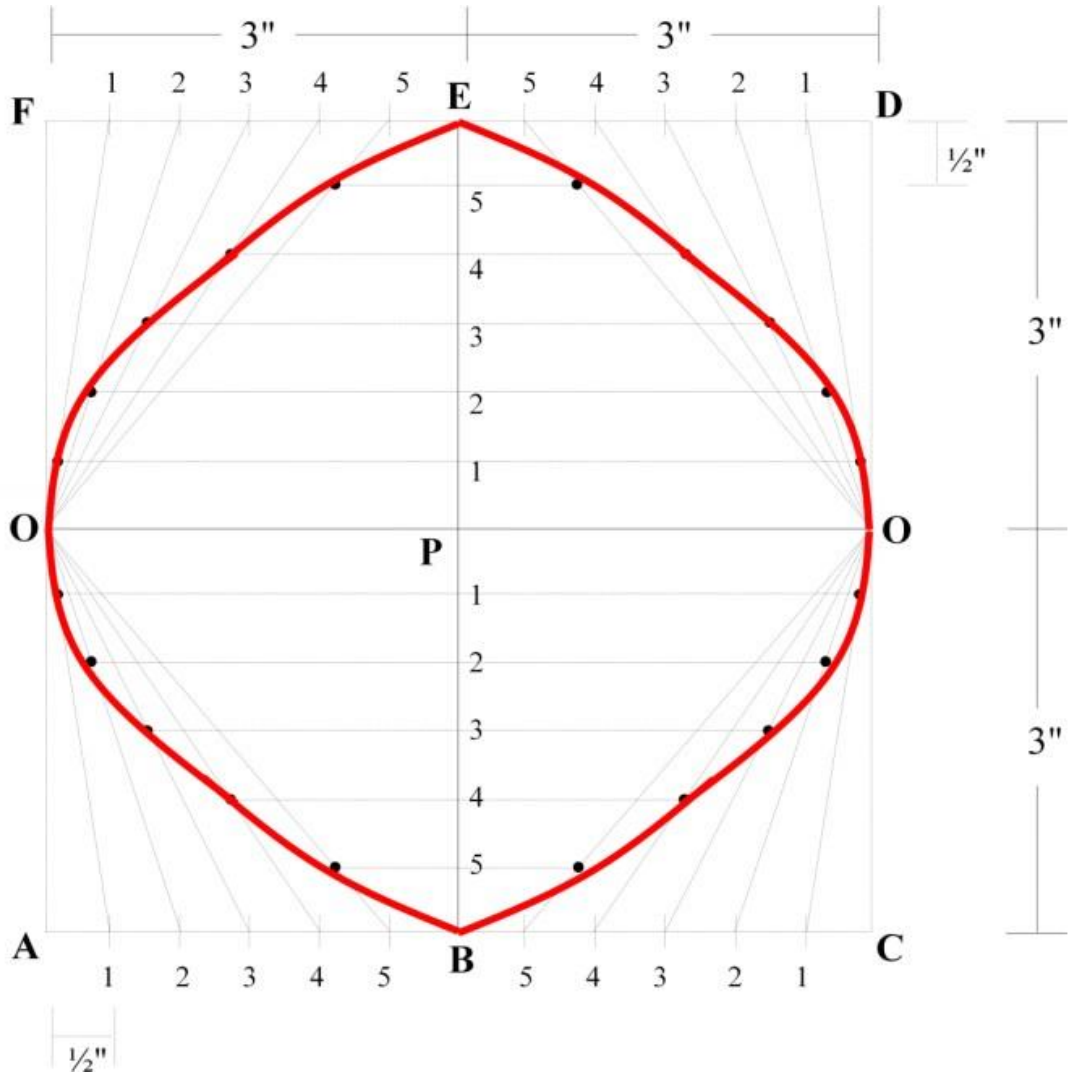
Parabola Drawing

Step 1: Take OM= 6 inch and BE= 6 inch and P is the center.
Step 2: Draw two lines AF and CD parallel and equal to BE. Step 3: Draw two lines FD and AC parallel and equal to OM.
Step 4: Now divide the lines EB in 12 equal portions,
each portion is 0.5 inch.
Step 5: Divide FD and AC at 12 equal portions and each portion is 0.5 inch.
Step 6: Number the portions as shown in figure (1,2,3,4,5).
Step 7: Join point O and M to all the points of the line FD and AC as shown in figure.
Step 8: Now join the lines as shown in figure. For example, **green color** line through point 5 of line EP touches two O5 lines and two M5 lines, **green color** line through point 4 of line EP touches two O4 lines and two M4 lines. Similarly do it for other points of line EB.
Step 9: Then join the points **(yellow color)** found from step 8 and draw the ellipse BOE and EMB **(red color)**.

Bold the parabola BOE,EMB. Give necessary dimensions.

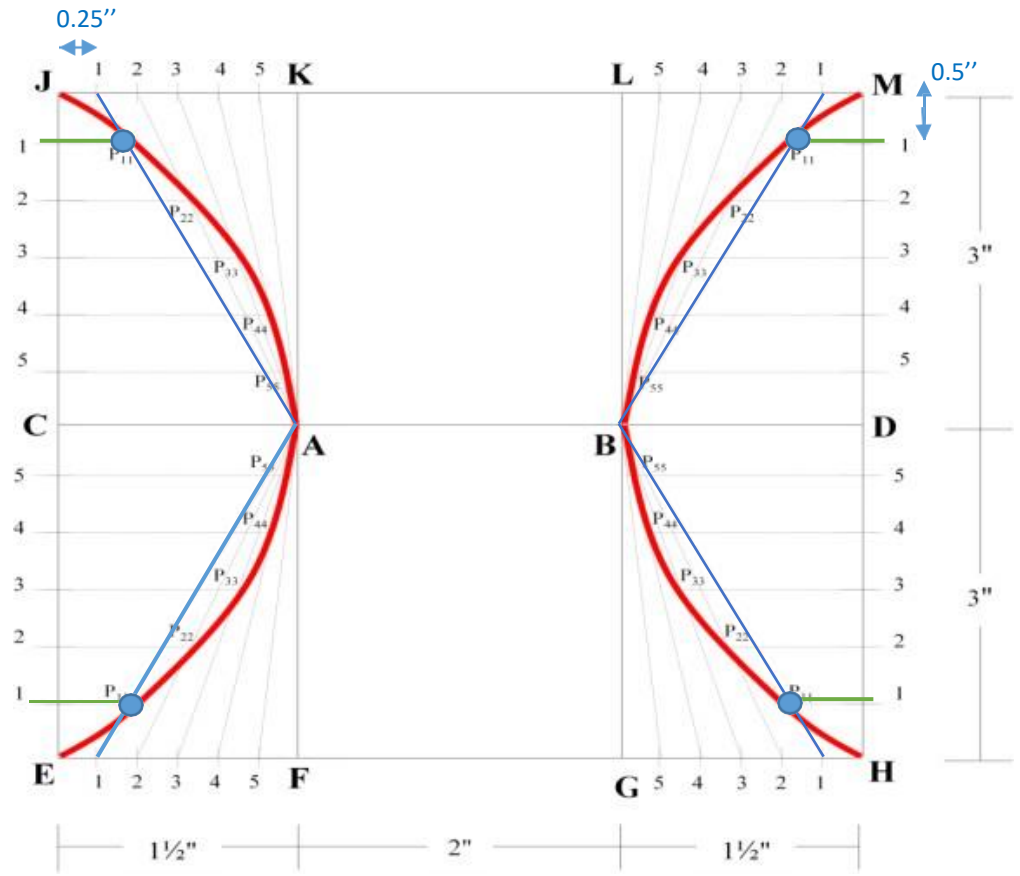


Use the dimensions of this slide for drawing parabola(HW)


3"
3"
F
E
D
A
B
C
O
O
P
½"
3"
3"
½"

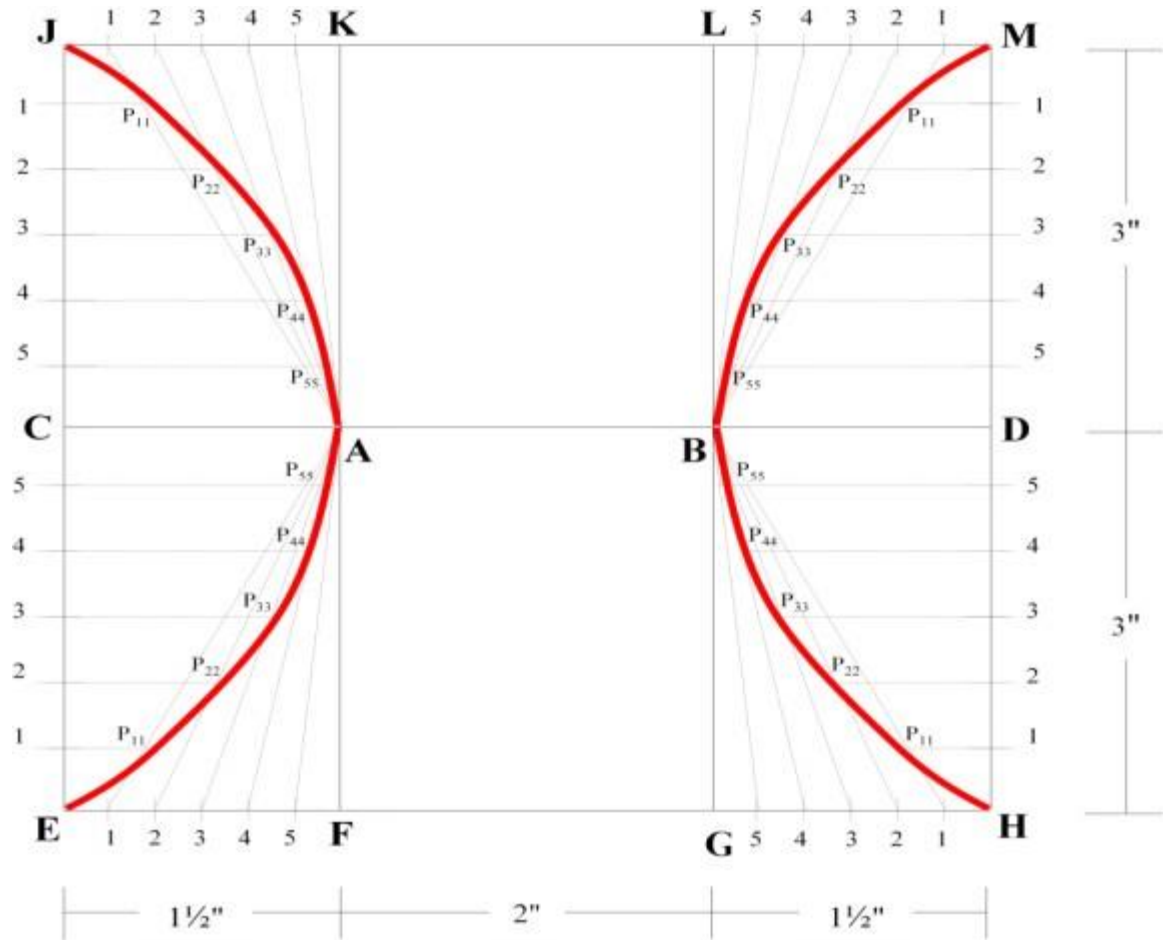
Hyperbola Drawing

Step 1: Draw line CD and take CA=BD= 1.5 inch and AB= 2 inch.
Step 2: Draw line FK through point A and take FA=AK=3 inch.
Step 3: Draw two lines EH and JM parallel and equal to CD.
Step 4: Draw EJ, GL, HM parallel and equal to FK.
Step 5: Divide EF,GH,JK,LM at 6 equal portions and each portion is 0.25 inch.
Step 6: Divide EC,CJ,HD,DM at 6 equal portions and each portion is 0.5 inch.
Step 6: Number the portions as shown in figure (1,2,3,4,5).
Step 7: Join point A to all the points of the line JK and EF as shown in figure **(one example is shown in blue color line)**.
Step 8: Join point B to all the points of the line LM and GH as shown in figure **(one example is shown in blue color line)**.
Step 8: Then join the lines as shown in figure to find points marked as P11 **(green color)**. Join other lines as well to find other points from P22 to P55.
Step 9: Then join the points P11 to P55 found from step 8 and hyperbola EAJ, HBM will be found.



Bold the hyperbola. Give necessary dimensions.

Use the dimensions of this slide for drawing hyperbola(HW)


J
K
L
M
E
F
G
H
A
B
C
D
1 2 3 4 5
5 4 3 2 1
P_{11}
P_{22}
P_{33}
P_{44}
P_{55}
3"
3"
1½"
2"
1½"

Note:

1. Use your engineering drawing instruments for proper and accurate drawing.

2. Give necessary dimensions in figure. Write down figure name below each figure.

You can use two or more drawing papers for completing your homework. You have to write the name plate box below each drawing paper page.

1	2
3	4

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Home Work:

1. Draw a regular pentagon, regular hexagon and regular octagon.
2. Draw a parabola, hyperbola and ellipse.

See the slides and use the dimensions that I have mentioned for your homework. Show the necessary dimensions and write down the figure name below your drawing.

You don’t have to use any color pen/pencil while drawing. You also don’t need to write any drawing steps. Just follow the slides, submission guidelines that I have told in the class as well as in this slide and complete the drawings.

THANK YOU