

MCE 101 INTRODUCTION TO ENGINEERING DRAWINGS 2 UNITS

Course Outline

1. Lettering and line works. Angles, Triangles, Quadrilaterals, Inscribing a circle in any regular polygon and inscribing any regular polygon in a circle.
2. Conic Sections; drawing true shape of the sections of the frustum of the cylinder. Development of simple engineering/fabricated objects such as frustum of cylinder and pyramid.
3. The Ellipse: ellipse by the rectangular method, auxiliary circle method, trammel method and foci method.
4. Common internal and external tangent to two equal and unequal circles, internal and external arc of a given radii.

Recommended Text

Technical Drawing for G.C.E. & C.S.E. by J.N.Green, Reprinted 1982.

Class work and assignments given for practical understanding of students.

Continuous assessment test given at the middle of semester to test students understanding.

Both CAT and Assignments form about 40% of the examination.

Examination carries 60%.

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1.0 LETTERING

-use of ruler and light pencil to produce plan and clear figures.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

1 2 3 4 5 6 7 8 9 0

Types of lines

Thick line for outlines _____

Thin line; dimension line, projection line, construction line, construction line and hatching line.—

Thin short dashes for hidden details

Thin long chain for centre lines, pitch circle, path line _ _ _ _

Thick long chain for cutting planes and viewing planes = = = =

~~~~~  
Ruled line and short zig-zags for long break lines  
~~~~~

Thick wavy line for short break lines and irregular boundry

1.1. Line Work

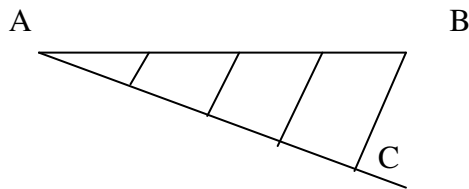
1.2. To bisect a given line

1.3. To construct a perpendicular at a given point on a straight line.

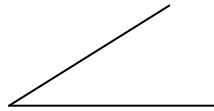
1.4. To construct a perpendicular at the end of a given line.

1.5. To draw a parallel line.

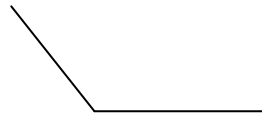
1.6. To divide a straight line into a given number of equal parts: draw the given line AB, draw line AC at any convenient angle to AB, Step off along AC the required no of equal divisions .Join the steps to point B. Draw the line.



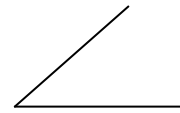
ANGLES: formed when two lines meet.



ACUTE ANGLE



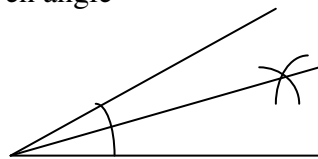
OBTUSE ANGLE



REFLEX ANGLE

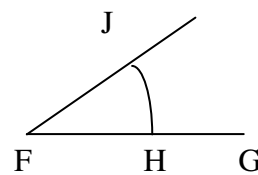
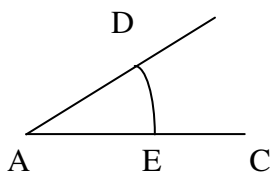
A)

To bisect a given angle



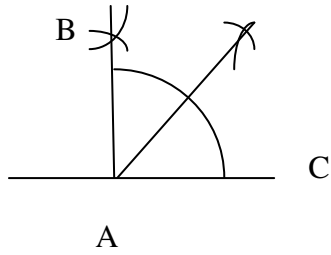
B)

To construct an angle similar to a given angle

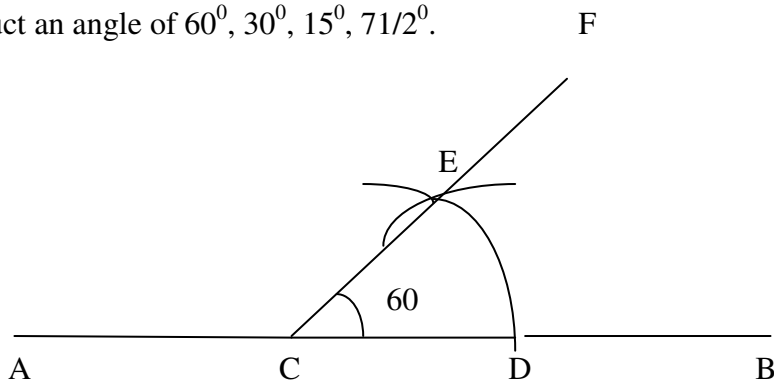


C)

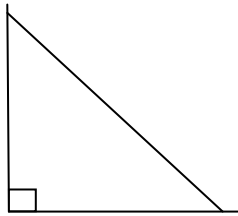
to construct an angle of 45°



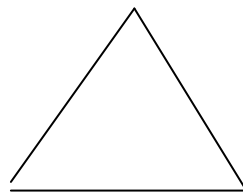
D) To construct an angle of 60° , 30° , 15° , $7\frac{1}{2}^\circ$.



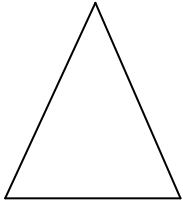
TRIANGLES



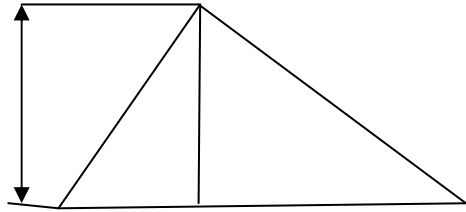
Right angled triangle



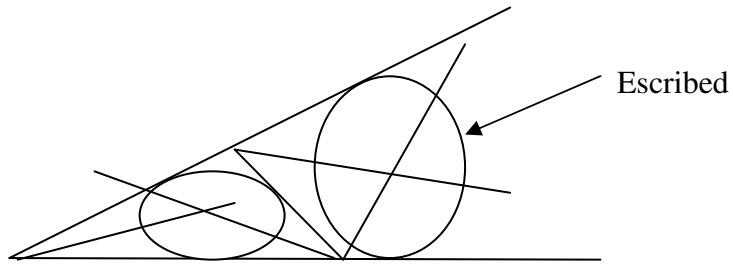
Equilateral triangle



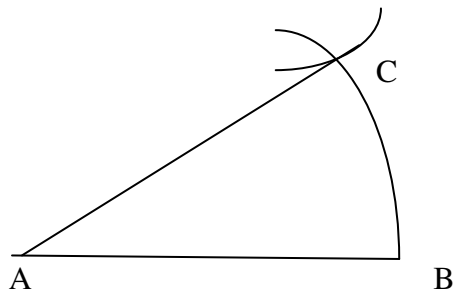
Isosceles triangle



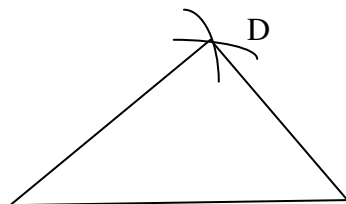
Scalene triangle



To construct any triangle given the length of the three sides.



To draw a triangle when given two sides and the included angle.

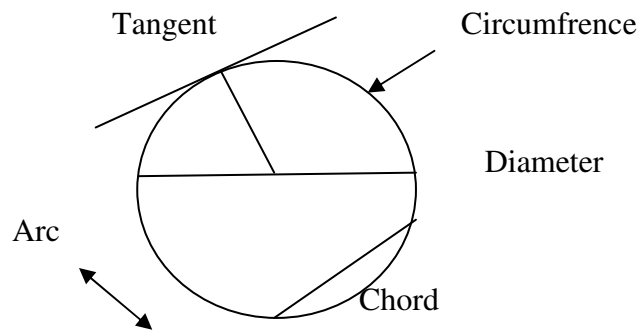


A

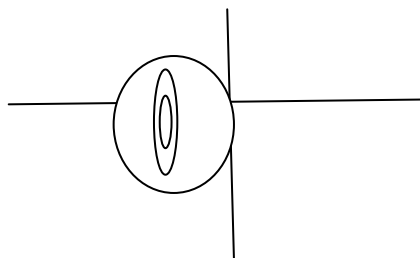
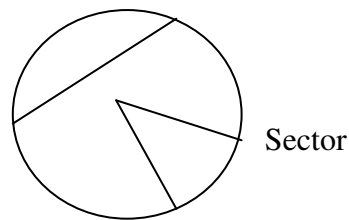
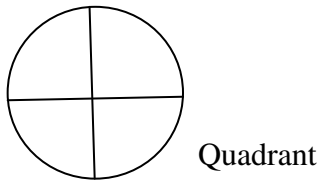
B

THE CIRCLE

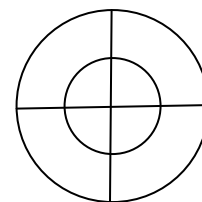
Circle, Diameter, Radius, Arc, Chord and Tangent



Segment

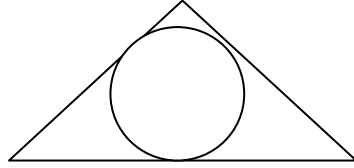


Eccentric circles



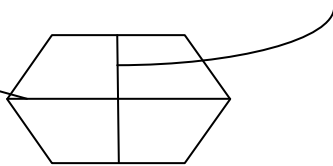
concentric circles

To draw an inscribed circle to a given triangle

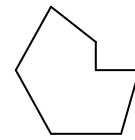


POLYGONS: sides greater than 4 Diameter

Diagonal
Regular Prism

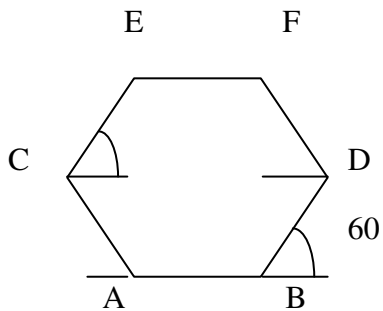


Altitude



Irregular

1. To draw a hexagon using a 60° set square when given the length of side.



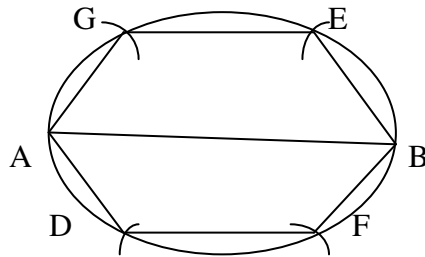
-draw one side AB

-draw a line from A and B in turn at 60°
and mark off the length of side C and D

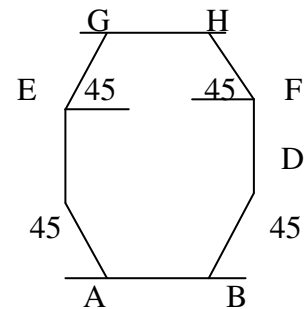
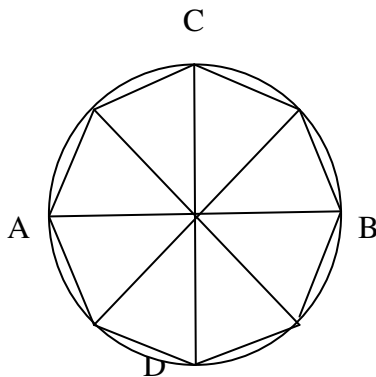
-draw a line from C and D in turn at 60° and mark off the length of side to give pts E and F. Join E to F.

2) To draw a hexagon within a circle when given the length of side.

Draw a circle of radius equal to the length of the given side, draw horizontal diameter AB. Draw arcs above and below with centre A and B. Join all pts.



To draw an octagon using 45° set square when given the length of side



CONIC SECTION

Frustum of a cylinder prism

SECTIONS

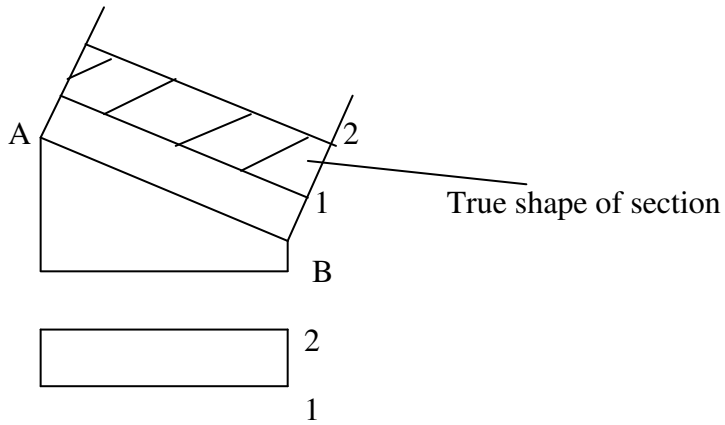
A rectangular prism with its top sliced off. The sliced surface is called THE SECTION. An object truncated. The part frustum.

To draw the true shape of the section

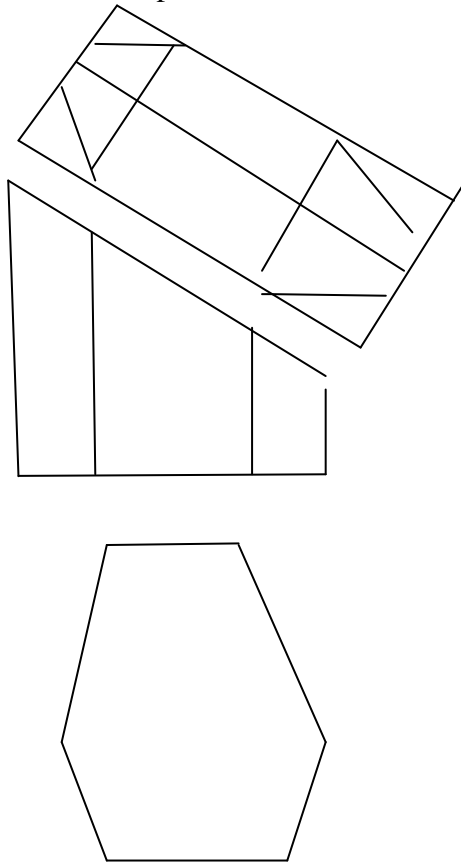
1. Draw lines perpendicular to the section from A and B. true length of sec.

2. At any point, draw the line parallel to the section.

3. Mark the true width of the section 1-2 from the plane.

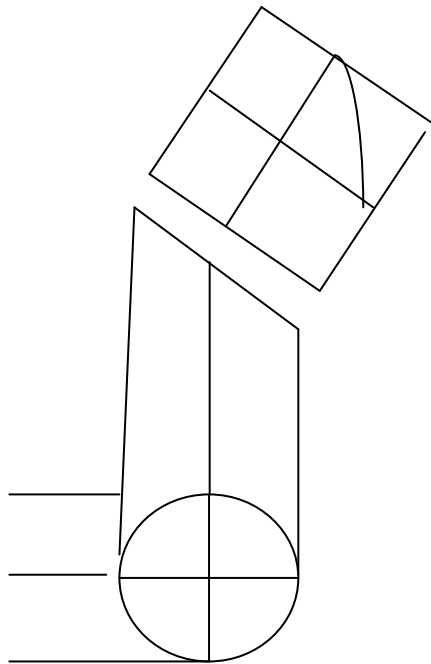


To draw the true shape of the section of the truncated hexagonal prism



To draw the true shape of the section of the frustum of the cylinder

1. Divide the circumference of the plan into 12 equal parts. Project lines from these points to the section AB.
2. Project lines perpendicular to the section AB from the point on it.
3. At a point, draw a centre line O parallel to the section. Mark 0-1, 0-2, 0-3(obtain from plan) on each side.

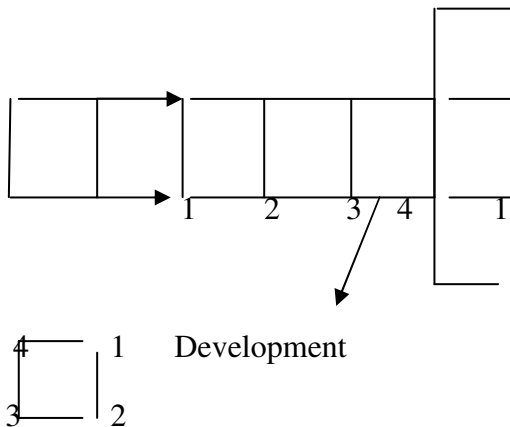


DEVELOPMENTS

To draw the development of an object means to draw the shape of all its surfaces laid out flat in one plane. The development when bent along certain lines will form the shape of the object.

A; To draw the development of the square prism

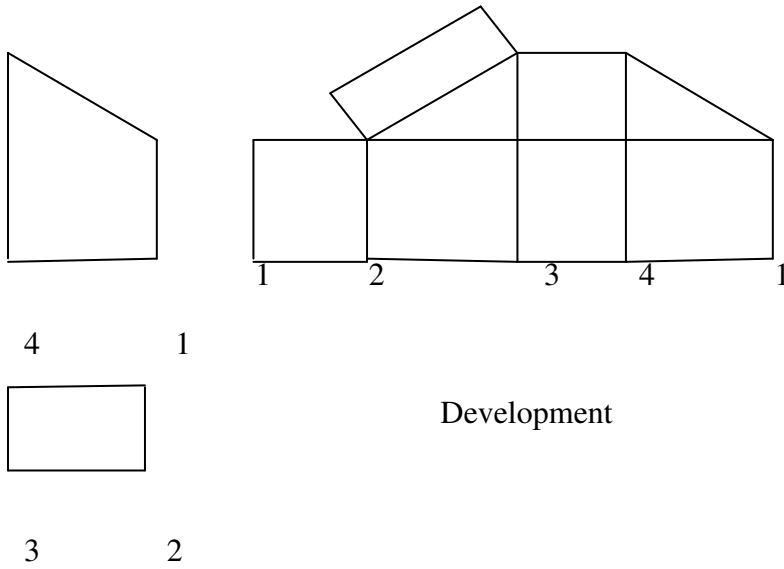
- Steps
1. Project lines from the elevation to obtain the height of the sides
 2. Mark 1-2, 2-3, 3-4, 4-1 from the plan.
 3. Add the top and bottom.



4 — 1 Development
3 — 2

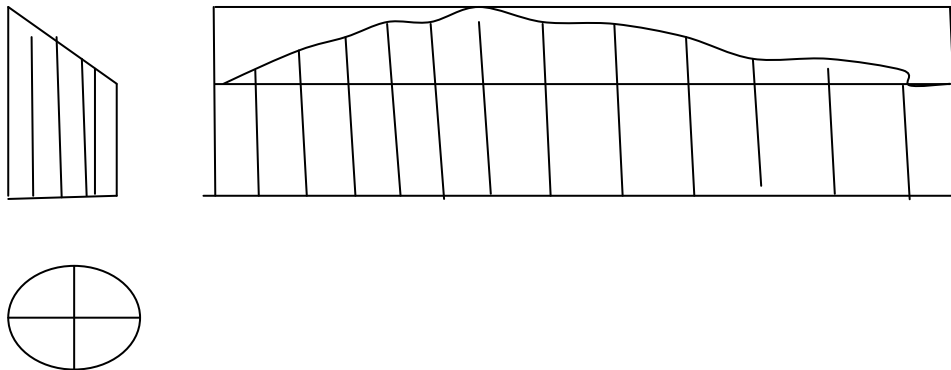
B To draw the development of the truncated prism

- Step:
1. Project lines from the elevation to obtain the heights of the sides.
 2. Mark 1-2, 2- 3, 3- 4, 4- 1 from the plan.
 3. Add the top and bottom.



C Development of the frustrum of the cylinder

1. Divide the circumference of the plan into a number of equal parts 1-12 and project these points to the section.
2. Project lines from the elevation to obtain the heights of the curve.
3. Mark units 1-12. Draw lines from these to intersect the above projection lines to obtain curve points.

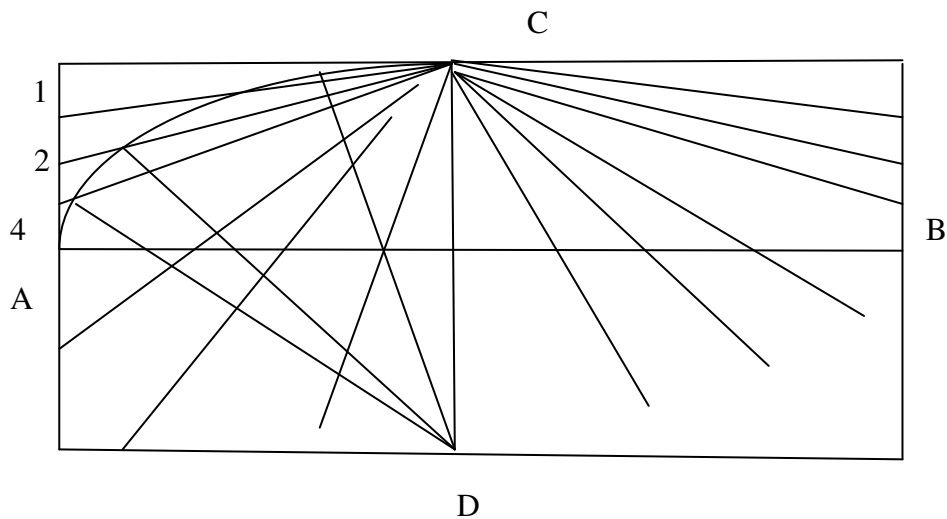


THE ELLIPSE

It is a plane figure bounded by a curved line termed the circumference. Its longest diameter is called the major axis while the shortest diameter is called minor axis. The two axes bisect at right angles.

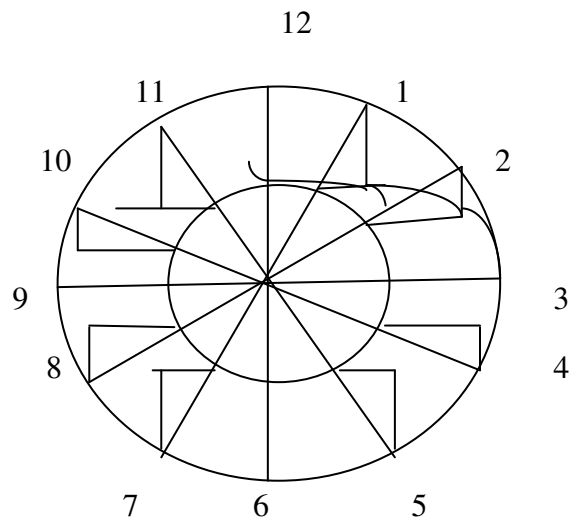
To draw an Ellipse by the Rectangle Method

1. Draw a rectangle equal to the major and minor axes. Draw the axes AB and CD.
2. Divide EA and AF into 4 equal units.
3. Radiate lines from C to 1,2 and 3 on AF.
4. Radiate lines from D through 1,2 and 3 on AE to intersect lines 1,2 and 3. These are the curve points.



To Draw an Ellipse by the Auxiliary Circle Method

1. Draw two concentric circles equal in diameter to the major and minor axes.
2. Divide the circumference of the larger circle into 12 equal parts. Join these points to the centre of the circle.
3. Draw verticals from points 1-12 and draw horizontals from the points where the radiating lines cut the inner circle, to intersect the verticals. These are the curve points.



To draw a Common External Tangent to Two Equal Circles

1. Draw a line through the centres of the circles.
2. Bisect the diameters AB. The bisectors cut the circumference of the circles at E and F.
3. Draw a line through E and F. This is the required tangent.

