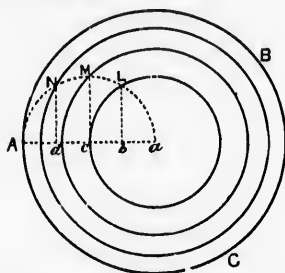


SHALL BE
CIRCLE.

PROBLEM 64.—TO DIVIDE A CIRCLE ABC INTO ANY NUMBER OF CONCENTRIC RINGS, THE AREAS OF WHICH SHALL HAVE A GIVEN RELATION TO EACH OTHER.



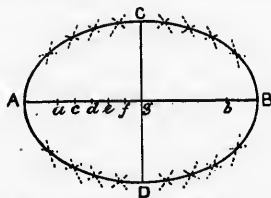
Draw the radius aA and divide it into parts having the desired ratio, in the points b, c, d .

Upon aA as diameter, describe a semicircle and erect perpendiculars to the line aA from the points b, c, d , meeting the circumference in the points L, M, N . From the centre a with radii aL, aM, aN , describe circles. They will divide the given circle in the desired ratio.

B.

SHALL BE
(METHOD).

PROBLEM 65.—TO DESCRIBE AN ELLIPSE, HAVING GIVEN A MAJOR AXIS, OR TRANSVERSE DIAMETER AB AND A MINOR AXIS, OR CONJUGATE DIAMETER CD .



Draw the diameters at right angles and bisecting each other in the point g .

From C or D as centre, with gA or gB as radius, describe arcs cutting the major axis in the points u and b . These points will be the foci of the ellipse.

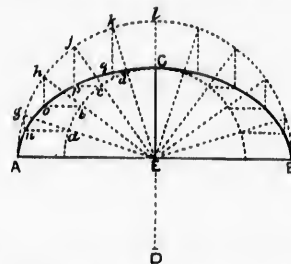
From a and b as centres, with radii Bc, Bd, Be , etc., describe arcs above and below the major axis.

From the same centres describe also arcs with radii Ac, Ad, Ae , etc., cutting the former arcs. The arcs with radius Ac meeting those with radius Be , etc.

The points in which the arcs meet will be in the circumference of the required ellipse.

to AB and

PROBLEM 65 (d).—(SECOND METHOD.)—TO CONSTRUCT AN ELLIPSE HAVING THE AXES AB, CD GIVEN.



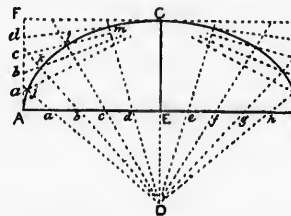
About the centre E describe circles with radii EC and ED .

Take any points in one of the circles as a, b, c, d , etc. Join these points to E and produce Ea, Eb, Ec , etc., to meet the outer circumference in g, h, i , etc.

Through a, b, c, d , etc., draw lines parallel to AB , and through g, h, i , etc., draw lines parallel to CE , to meet the former in u, o, p , etc.

These points are to be joined freehand to form the required ellipse.

PROBLEM 65 (d).—(THIRD METHOD.) TO CONSTRUCT AN ELLIPSE WHEN THE AXES AB, CD ARE GIVEN.



Construct the rectangle $AFCH$.

Divide AE, EB , into any number of parts (for simplicity use equal parts) and divide AF, CH similarly.

Join D , the opposite extremity of the minor axis, to the points of division a, b, c , etc., in AB , and produce the lines to meet lines drawn from C to the points of division in AF, CH .

The points of intersection j, k, l , etc., will be in the required ellipse.