

described on AC , BC as diameters meet BE , AD respectively at F , G and H , K : shew that F , G , H , K lie on the circumference of a circle.

543. Two diameters in a circle are at right angles; from their extremities four parallel straight lines are drawn; shew that they divide the circumference into four equal parts.

544. E is the middle point of a semicircular arc AEB , and CDE is any chord cutting the diameter at D , and the circle at C : shew that the square on CE is twice the quadrilateral $AEB C$.

545. AB is a fixed chord of a circle, AC is a moveable chord of the same circle; a parallelogram is described of which AB and AC are adjacent sides: find the locus of the middle points of the diagonals of the parallelogram.

546. AB is a fixed chord of a circle, AC is a moveable chord of the same circle; a parallelogram is described of which AB and AC are adjacent sides: determine the greatest possible length of the diagonal drawn through A .

547. If two equal circles be placed at such a distance apart that the tangent drawn to either of them from the centre of the other is equal to a diameter, shew that they will have a common tangent equal to the radius.

548. Find a point in a given circle from which if two tangents be drawn to an equal circle, given in position, the chord joining the points of contact is equal to the chord of the first circle formed by joining the points of intersection of the two tangents produced; and determine the limit to the possibility of the problem.

549. AB is a diameter of a circle, and AF is any chord; C is any point in AB , and through C a straight line is drawn at right angles to AB , meeting AF , produced if necessary at G , and meeting the circumference at D : shew that the rectangle FA , AG , and the rectangle BA , AC , and the square on AD are all equal.

550. Construct a triangle, having given the base, the vertical angle, and the length of the straight line drawn from the vertex to the base bisecting the vertical angle.

551. A , B , C are three given points in the circumference of a given circle: find a point P such that if AP , BP , CP meet the circumference at D , E , F respectively, the arcs DE , EF may be equal to given arcs.