

385. If at a given point two circles intersect, and their centres lie on two fixed straight lines which pass through that point, shew that whatever be the magnitude of the circles their common tangents will always meet in one of two fixed straight lines which pass through the given point.

VI. 7 to 18.

386. If two circles touch each other, and also touch a given straight line, the part of the straight line between the points of contact is a mean proportional between the diameters of the circles.

387. Divide a given arc of a circle into two parts, so that the chords of these parts shall be to each other in a given ratio.

388. In a given triangle draw a straight line parallel to one of the sides, so that it may be a mean proportional between the segments of the base.

389. ABC is a triangle, and a perpendicular is drawn from A to the opposite side, meeting it at D between B and C : shew that if AD is a mean proportional between BD and CD the angle BAC is a right angle.

390. ABC is a triangle, and a perpendicular is drawn from A on the opposite side, meeting it at D between B and C : shew that if BA is a mean proportional between BD and BC , the angle BAC is a right angle.

391. C is the centre of a circle, and A any point within it; CA is produced through A to a point B such that the radius is a mean proportional between CA and CB : shew that if P be any point on the circumference, the angles CPA and CBP are equal.

392. O is a fixed point in a given straight line OA , and a circle of given radius moves so as always to be touched by OA ; a tangent OP is drawn from O to the circle, and in OP produced PQ is taken a third proportional to OP and the radius: shew that as the circle moves along OA , the point Q will move in a straight line.

393. Two given parallel straight lines touch a circle, and SPT is another tangent cutting the two former tangents at S and T , and meeting the circle at P : shew