

606. Shew that the locus of the middle points of straight lines parallel to the base of a triangle and terminated by its sides is a straight line.

607. A parallelogram is inscribed in a triangle, having one side on the base of the triangle, and the adjacent sides parallel to a fixed direction: shew that the locus of the intersection of the diagonals of the parallelogram is a straight line bisecting the base of the triangle.

608. On a given straight line AB as hypotenuse a right-angled triangle is described; and from A and B straight lines are drawn to bisect the opposite sides: shew that the locus of their intersection is a circle.

609. From a given point outside two given circles which do not meet, draw a straight line such that the portions of it intercepted by each circle shall be respectively proportional to their radii.

610. In a given triangle inscribe a rhombus which shall have one of its angular points coincident with a point in the base, and a side on that base.

611. ABC is a triangle having a right angle at C ; $ABDE$ is the square described on the hypotenuse; F, G, H are the points of intersection of the diagonals of the squares on the hypotenuse and sides: shew that the angles DCE, GFH are together equal to a right angle.

MISCELLANEOUS.

612. O is a fixed point from which any straight line is drawn meeting a fixed straight line at P ; in OP a point Q is taken such that the rectangle OP, OQ is constant: shew that the locus of Q is the circumference of a circle.

613. O is a fixed point on the circumference of a circle, from which any straight line is drawn meeting the circumference at P ; in OP a point Q is taken such that the rectangle OP, OQ is constant: shew that the locus of Q is a straight line.

614. The opposite sides of a quadrilateral inscribed in a circle when produced meet at P and Q : shew that the square on PQ is equal to the sum of the squares on the tangents from P and Q to the circle.

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