

sides, shew that P is in all cases in one of the diagonals of the rectangle.

375. In the figure of I. 43 shew that if EG and FH be produced they will meet on AC produced.

376. APB and CQD are parallel straight lines, and AP is to PB as DQ is to QC : shew that the straight lines PQ , AC , BD , produced if necessary, will meet at a point: shew also that the straight lines PQ , AD , BC , produced if necessary, will meet at a point.

377. ACB is a triangle, and the side AC is produced to D so that CD is equal to AC , and BD is joined: if any straight line drawn parallel to AB cuts the sides AC , CB , and from the points of section straight lines be drawn parallel to DB , shew that these straight lines will meet AB at points equidistant from its extremities.

378. If a circle be described touching externally two given circles, the straight line passing through the points of contact will intersect the straight line passing through the centres of the given circles at a fixed point.

379. D is the middle point of the side BC of a triangle ABC , and P is any point in AD ; through P the straight lines BPE , CPF are drawn meeting the other sides at E , F : shew that EF is parallel to BC .

380. AB is the diameter of a circle, E the middle point of the radius OB ; on AE , EB as diameters circles are described; PQL is a common tangent meeting the circles at P and Q , and AB produced at L : shew that BL is equal to the radius of the smaller circle.

381. $ABCDE$ is a regular pentagon, and AD , BE intersect at O : shew that a side of the pentagon is a mean proportional between AO and AD .

382. $ABCD$ is a parallelogram; P and Q are points in a straight line parallel to AB ; PA and QB meet at R , and PD and QC meet at S ; shew that RS is parallel to AD .

383. A and B are two given points; AC and BD are perpendicular to a given straight line CD ; AD and BC intersect at E , and EF is perpendicular to CD : shew that AF and BF make equal angles with CD .

384. From the angular points of a parallelogram $ABCD$ perpendiculars are drawn on the diagonals meeting them at E , F , G , H respectively: shew that $EFGH$ is a parallelogram similar to $ABCD$.