Prove that no parallelogram can be inscribed in a circle except a rectangle ; and that no parallelogram can be described about a circle except a rhomb.

8. Similar triangles are to one another in the duplicate ratio of their homologous sides. How does it appear from Euclid that the duplicate ratio of two magnitudes is the same as that of their squares?

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## FIRST CLASS PROVINCIAL CERTIFICATES, JULY, 1876

### TIME—THREE HOURS.

*N. B.—Algebraic symbols must not be used.*

1. (a) The straight line drawn at right angles to the diameter of a circle from the extremity of it, falls without the circle ; and no straight line can be drawn from the extremity, between that straight line and the circumference, so as not to cut the circle. (III 16.)

 (b) Draw a common tangent to two given circles. How many can be drawn ? (*Apollonius.*)

2. (a) The opposite angles of any quadrilateral figure inscribed in a circle are together equal to two right angles. (III 22.)

 (b) If straight lines be drawn from any point on the circumference of a circle perpendicular to the sides of an inscribed triangle, their feet are in the same straight line. (*M. F. Jacobi.*)

3. (a) If the chord of a circle be divided into two segments by a point in the chord or in the chord produced, the rectangle contained by these segments will be equal to the difference of the squares on the radius and on the line joining the given point within the centre of the circle. What propositions in Euclid follow immediately from this?

 (b) Describe a circle which shall pass through a given point and touch two straight lines given in position. (*Apollonius.*)

4. (a) To describe an isosceles triangle, having each of the angles at the base double of the third angle. (IV 10.)

 (b) Construct a triangle having each of the angles at the base equal to seven times the third angle.

5. (a) If the vertical angle of a triangle be bisected by a straight line which also cuts the base, the segments of the base have the same ratio which the other sides of the triangle have to one another ; and, if the segments of the base have the same ratio which the other sides of the triangle have to one another, the straight line